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PAPER TRADE JOURNAL

VOL. 124, NO. 1 JANUARY 2, 1947

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Canada's Woods Operators Seek Secure Tenures
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Mahaney Presides at Panelyte Meeting
West Virginia Acquires South Carolina Acreage
Abitibi Looks for Sharp Rise in Profits
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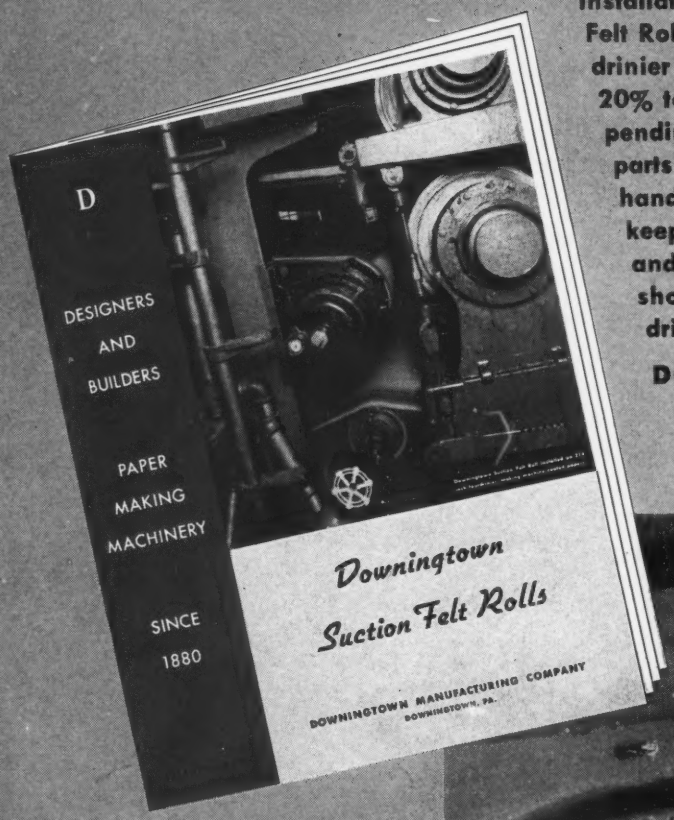

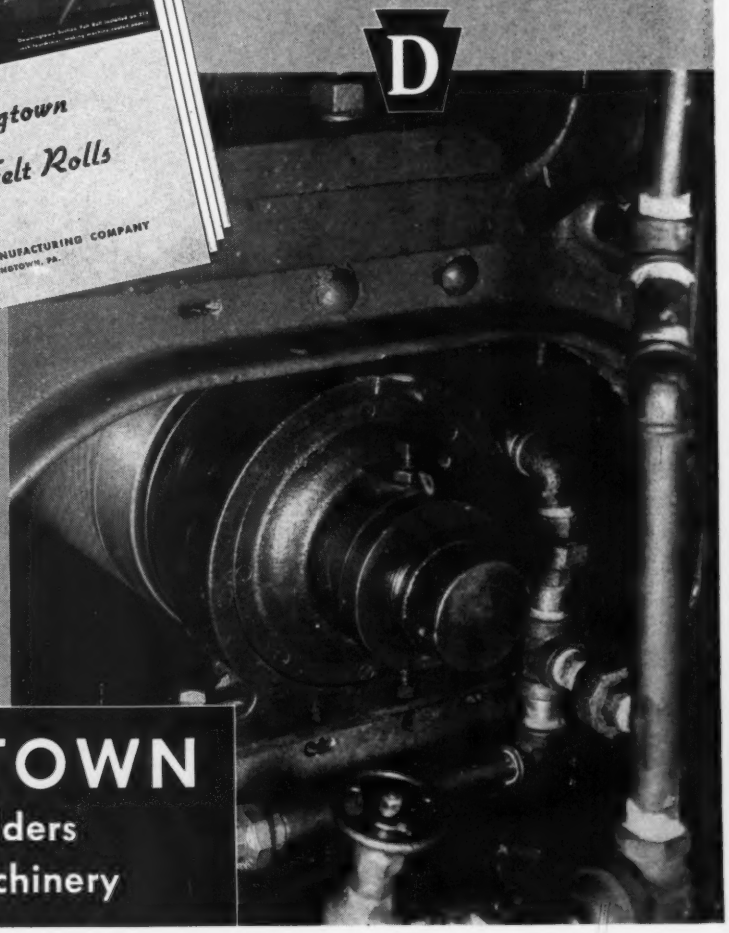

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PAPER TRADE JOURNAL

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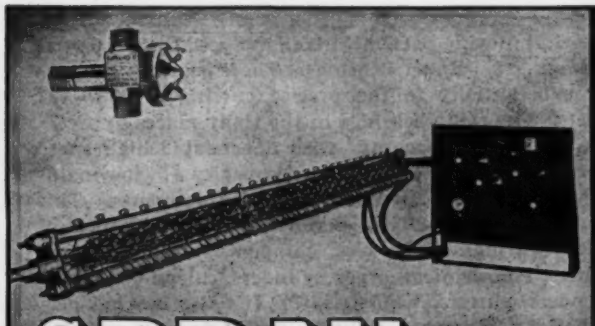

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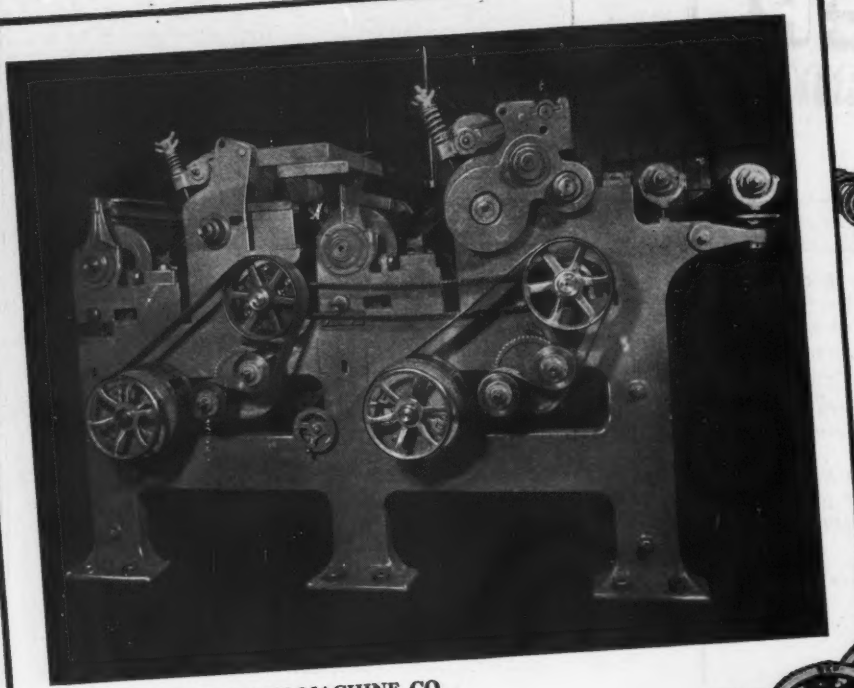

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PAPER TRADE JOURNAL

January 2, 1947 Vol. 124, No. 1

Title Reg. U. S. Pat. Off.

Canada's Woods Operators Seek More Secure Lease Tenures

TORONTO, Ont.—Briefs have been presented at the Toronto sittings of Major-Gen. Howard Kennedy's commission enquiring into Ontario's forestry resources, but several of them have litle reference to the main objectives of the inquiry. Chief interest last week centered on the submission of Ontario Forest Industries Association. This brief put the repeal of the Forest Resources Regulation Act of 1937 as of first importance, to make it possible for woods operators to obtain security of tenure on their timber limits and extend timber licenses from the present one-year basis to 10 to 21 years and subject to renewal.

The brief pointed out that total investment in the forest industries in Ontario in 1943 amounted to $390 million, averaging $136,463 for each establishment and that the pulp and paper industry with $188 million has the largest investment of any single industry in the province. According to the figures submitted, the gross value of the production was $319,934,124 or 28.2 per cent of all forest industries in Canada. The industry paid out $102 million in wages to 77,815 employees; $18 million for transportation; $6.5 million for fuel; $4 million for electric power; $9.8 million for chemicals. The total value of the materials used amounted to $125 million, the brief stated.

Before the Resources Regulation Act came into force agreements granting cutting rights were generally regarded as secure, but the Act gives power to the Minister of Lands and Forests to abrogate agreements and re-distribute lands as he sees fit. Thus the operator is handicapped in long-range planning. The possibility of arbitrary cancellation of cutting rights must be eliminated in the interests of the public, according to the submission.

The brief also suggested immediate action to permit and encourage an increase in immigration into Canada from the British Isles and Northern and Central Europe, arguing that there are not enough woods workers in Ontario. Workers must be recruited each year from other provinces, with the operators paying the transportation charges, the brief stated, and went on to point out that the development of North and Northwestern Ontario depends to a large extent upon the utilization of forest resources.

Another suggestion advanced by the brief was that a complete forest inventory be made as soon as possible, contending that without accurate data, the full depletion effect of losses from logging operations, fire, insects and disease cannot be evaluated. A forest policy which provides for forest management on a sustained yield basis is dependent upon working plans and it was suggested that cutting rights should not be granted on areas where there is no knowledge of the volume of timber available.

The preparation of working plans for all allocated Crown lands should be the responsibility of the holder, aided by the Department of Lands and Forests, which would have the final say on such plans, according to the brief. Immediate preparation by the department of plans for unalienated forest lands, should be undertaken.

It was submitted that to place all forest lands on a substantial yield basis, thereby protecting established wood supply for established industries and communities, the department should ascertain the capacity of the area to support additional industries and provide for future requirements,

(Continued on page 22)

Walker Hamilton Joins Riegel 25 Year Club

NEW YORK—When employees of the Riegel Paper Corporation and the Riegel Textile Corporation held their annual Christmas party at the Park Lane Hotel on December 23rd, gold watches, honoring 25 years or more of service were presented by John L. Riegel to four of the local office. Walker Hamilton, executive vice-president and general manager of Riegel Paper, was the only representative of his company.

Among those present to wish the employees a Merry Christmas and a Happy New Year was Mrs. Leila Riegel, widow of Benjamin D. Riegel, founder of the Riegel Textile Corporation, and for many years chairman of the board of Riegel Paper.

Midwest Views 1947 With Confidence

CHICAGO — The Midwestern market leaves 1946 secure in the belief that while 1947 may not show any material increase in sales, it will certainly provide more profitable operation and more opportunity to attack sanely the many puzzling problems confronting the trade. Optimism continues to be the keynote of all statements which are being issued — an optimism tempered, however, with the gravity of the labor-management position in its relation to the possibilities of retarded or extended production.

There is no reported worry about demand. There is, however, concern over the ability of the industry to produce sufficient pulp and paper. But even while that worry is acute, there is some genuine fear expressed that this very tightness of the market will cause too great a development in the industry, leading later to over-production, price cutting and profitless prosperity in the not too far distant future.

The industry continues to worry about the glowing financial reports concerning the paper trade and its financial return possibilities and about the reported "carelessness" with which funds are being loaned to newcomers to the trade. The pulp sources of supply are also another real headache and, in the newsprint industry, in particular, there is widespread belief that wartime conservation measures on waste papers of all grades must be continued as a permanent feature of paper operation in all its phases.

The waste paper market this week was featured by a $1 a ton increase in the price of No. 1 old corrugated and No. 1 news. At the close of the week, corrugated was bringing $31 at the mills and news was selling at $30. No. 1 mixed held firm at $19. Reports indicated that the increases were due to cold weather which had reduced collections.

Will Reopen Chicoutimi Mill

QUEBEC, Que — Premier Duplissis this week announced he had been informed by L. Cornillat, French industrialist, that it has been decided to reopen the pulp and paper mill at Chicoutimi. Mr. Cornillat is head of a group of Canadian and French capitalists which will operate the new undertaking.

Mahaney Presides At Panelyte Meeting

TRENTON, N. J.—Approximately one hundred executives, sales personnel, and production men attended a sales conference of the Panelyte Division of St. Regis Paper Company at Trenton, December 18, 19 and 20. E. R. Gay, vice-president of St. Regis was principal speaker at the meeting. He traced the company's history from the time of its founding in 1899 to the present. He told of how the organization grew from a single paper mill at Deferiet, N. Y., to become one of the leading paper companies in America, with an estimated sales in 1947 of over $100,000,000. Mr. Gay explained that Panelyte, which first achieved distinction in the refrigeration field, is now used in ten major industries. He said this development is similar to that of the multiwall bag division which got its start among cement producers and now serves several large industries.

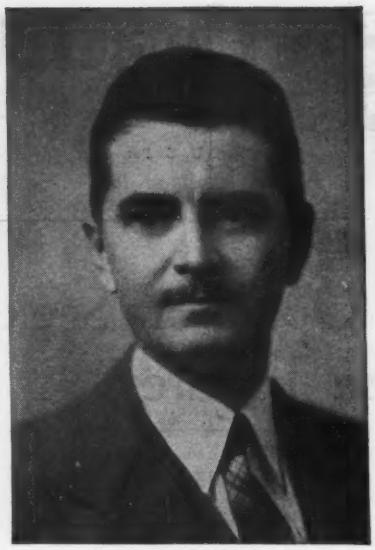
C. R. Mahaney, St. Regis vice-president, general manager of the Panelyte Division, and executive vice-president of the St. Regis Sales Corporation, in charge of the sale of Panelyte products, presided over the meeting and spoke at the initial gathering at the Stacy Trent hotel. He outlined the company's growth since St. Regis took over the Panelyte company in 1929. He told of the various periods of Panelyte operation, such as the manufacture of refrigerator inner doors, light-colored and curved-colored breaker strips in 1939, essential war materials in 1941 and '42 and the development of the fabrication specialty department since then.

In telling of the uses of the company's plastics Mr. Mahaney said, "These proved and accepted plastics are used extensively by the refrigeration, radio, automotive and aviation industries. They are not substitutes in any sense of the word."

Marathon Names Davis to Head Food Packaging Research

MENASHA, Wis.—Leo E. Croy, executive vice-president, Marathon Corporation, has reported the appointment of D. W. Davis as director of research for all food packaging materials and packages manufactured by that corporation. Davis, will plan and direct Marathon's continuous research in the highly important and diversified protective food packaging industry.

Davis has been actively engaged in research work for Marathon over five years—first in the corporation's Rothschild division, and since 1944 in the Menasha converting division. Prior to his employment with Marathon, Davis was associated with the DuPont Company for ten years as a research chemist. His technical education includes an A.B. degree in chemistry from Lawrence College, and a Ph.D. degree in chemistry from the University of Illinois.



E. P. McGINN

Pat McGinn Joins Sutherland Staff

TRENTON, N. J. — E. P. McGinn, known to his many friends in the paper industry as Pat, has joined the sales-engineering staff of the Sutherland Refiner Corporation. Pat was formerly chief chemist, Paper Division of National Oil Products Company, Harrison, N. J. Before that, he was pulp research supervisor for Minnesota & Ontario Paper Company at International Falls, Minn., and paper and board chemist and beater foreman for Champion Paper & Fiber Company at Canton, N. C., and at Hamilton, Ohio.

Previous to these connections, he was paper technologist for St. Regis Paper Company, Deferiet, N. Y., paper tester at Foster Paper Company, Utica, N. Y., and a technical foreman with the United States Forestry Service at Park Falls, Wisconsin. Pat is a graduate of the pulp and paper course at Syracuse University.

Pulp Men Lecture At Polytechnic

BROOKLYN, N. Y. — Among the lecturers in the graduate course on Pulp and Paper Technology offered on Thursday evenings at the Polytechnic Institute of Brooklyn were Rex Vincent of the Bulkley, Dunton Pulp Company, Inc., and Joel Haywood of the West Virginia Pulp & Paper Company, Luke, Md. The latter gave an instructive lecture on the sulphate pulping of both softwoods and hardwoods for the production of paper and rayon pulp. Henry J. Perry, formerly of the J. P. Lewis Co., now a pulp consultant, is scheduled to give a lecture on "Beating, Its Theory and Techniques."

The course is offered to qualified men from the paper and paper industry in the metropolitan area and convenes from 6 to 8 P.M. on Thursdays.

Kimberly-Clark Buys Mammoth Bearings

NIAGARA, Wis.—The paper trade has exhibited much interest in the news this week that the paper mill of the Kimberly - Clark Corporation is the purchaser of the largest spherical roller bearings ever built. They are being manufactured by SKF Industries, Inc., for the world's biggest super-calender machine now under construction at the Beloit Iron Works in Beloit, Wis., for Kimberly-Clark. The bearings will weigh more than two and a half tons when fully assembled. Four feet in diameter and 1,500,000 times heavier than the smallest bearing produced by the SKF company, they form only a part of the bearing equipment required for the super-calender. Eighteen other spherical roller bearings, two of them weighing 2700 pounds each and 16 weighing 121 pounds each, making a total weight for all bearings of 17,536 pounds, are also being made for the top and intermediate rolls of the calender. Rolled forgings which will become the inner rings of the 5100 pound bearings, each of whose 38 rollers will weigh about 35 pounds apiece, were the first, according to reports, to be clamped into the jaws of one of the company's boring mills.

Excess metal, it is said, will be reroved from the forgings by carbide cutting tools before the rings are hardened by heat treating, sand-blasted, and sent to grinding machines. Each of the bearings will be used to support the bottom rolls of the ten-roll calender.

Rasmussen in Charge Of Varlar Operation

CHICAGO—James H. Rasmussen has been named as executive vice-president of Varlar, Incorporated, a division of United Wallpaper, Inc. Rasmussen will continue as executive vice-president of Trimz Company, Inc., another division of the parent company, and also as vice-president in charge of sales and merchandising for United Wallpaper. John E. Williams will continue as vice-president in charge of sales for Varlar, Inc.

Rasmussen joined United on Sept. 1, 1945, after five years as general sales manager of Crosley Corporation, Cincinnati. Prior to that he was assistant general sales manager of Zenith Radio Corporation for six years. Varlar, Inc., produces Varlar, new stainproof wall covering.

Nekoosa Foundry Ups Scale

NEKOOSA, Wis.—The Nekoosa Foundry and Machine Works has granted a raise of eight cents an hour to employees earning less that $1. A 2-cent hourly increase was granted about a month ago. Minimum rates now range from 99 cents to $1.32 per hour.

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Midwest Sapeyes Hear Chaplain

CHICAGO — Foregoing its annual Christmas party, held annually for many years up to this year, the western division of the Salesmens Association of the Paper Industry officially closed the 1946 season with its annual Christmas luncheon on Monday noon, December 23, at the Hotel Sherman. An excellent audience of members and guests heard Bishop Wallace Edmonds Conkling, chaplain of the SAPEYES, deliver his annual Christmas message. His subject was "How big is God? How big are you?" The chaplain gave one of his most inspirational talks, straightforward, timely and, from comments noted, particularly interesting to business executives.

Ed Edwards, vice-president of the Western division, acted as presiding officer and introduced the speaker. That part of the program, however, was preceded by the singing of two songs by Mr. Edwards' son, sixteen years old, who did a most excellent job of providing the right atmosphere for the speaking part of the program.

Among the guests who attended was Ed[illegible] Hall of Cincinnati, Ohio, representative of the Crossett and Central Paper companies in that area. Mr. Hall is a member of the western division of the SAPEYES in his own right, having become affiliated with the group back in the days when he was with Pilcher-Hamilton and served as president of the Chicago Paper Association. He is currently president of the Paper & Twine Association.

The western division on January 7 will resume its weekly luncheons when, it is expected, awards will be given to members who have made unusual contributions to the work of the Association during the past year.

Tuttle Press Elects Two Vice-Presidents

APPLETON, Wis. — Two new vice-presidents of the Tuttle Press Company were elected at a meeting of the board of directors on December 20. H. D. Purdy, a director and assistant secretary, was named vice-president in charge of production, and L. R. Watson, a director, general sales manager and secretary of the firm, was elected vice-president in charge of sales. Both have been members of the board for some time.

Mr. Purdy has been with the company since 1924, and Mr. Watson for about 28 years, the last 13 of them as general sales manager.

Holyoke Pays Tribute To Frank B. Towne

HOLYOKE, Mass.—A delegation from the executive board of the Holyoke Chamber of Commerce, President John N. Hazen, former president William H. Hubbard, Robert E. Barrett, Jr., and Secretary Conrad J. Hemond, visited the National Blank Book Co. office yesterday afternoon and presented Treasurer Richard E. Towne with a framed engrossed-in-color copy of the appreciation drawn and adopted by the Chamber as a memorial to his father, the late Frank Bookwith Towne. The framed copy was prepared by Paul A. Noffke, who is an artist of note as well as a famous entertainer.

West Virginia Acquires South Carolina Acres

CAMDEN, S. C.—L. I. Guion, Jr., has sold the L. I. Guion plantation of some 8,500 to 10,000 acres to the West Virginia Paper & Pulp Company, with offices in Charleston, and Edwin B. Boyle, of Sumter. According to Mr. Boyle, who is mayor of Sumter, his share in the purchase includes some 3,000 plus acres west of highway 26, known as the Eastover road, while the purchase by the West Virginia Paper & Pulp Company includes some 5,300 acres west of the Eastover highway.

The West Virginia company, it is reported, will use considerable of the timber on its 5,300 acres for paper and pulpwood operations.

The reported price paid for the property ranges from $250,000 to $300,000. Mr. Boyle said he paid $150,000 for acreage and buildings he acquired.

Paul E. Large Resigns to Join Mill Agent Firm

STURGIS, Mich.—Paul E. Large, assistant sales manager of the Harvey Paper Products Company, has resigned his position to become associated with the Slusser Paper Specialties Company of Detroit, mill agents, who represent the Harvey Paper Products Company, The Allied Paper Bag Company of Baltimore, and other manufacturers of paper products.

Mr. Large has been with the Harvey Company for the past more than eleven years, with the exception of three years when he served with the U. S. Navy as a Supply Officer. While on duty as Supply Officer of CINPAC, he was awarded the Bronze Star for outstanding services in connection with the establishment of Admiral Nimitz' headquarters on Guam.

North Carolina to Study Pulpwood Rate Structure

RALEIGH, N. C.—The North Carolina Utilities Commission declared on December 26 that a hearing would be scheduled later on a proposed increase in rates on pulpwood in car lots. Pulp shippers protested an increase, scheduled for January 1, and the commission is planning an investigation of the rate structure on pulpwood, it was stated.

Urges Woods Control In Headwater Areas

TORONTO, Ont. — "It is a complete waste of time fiddling around with county councils," H. M. Bauden told Maj.-Gen. Howard Kennedy's royal commission inquiring into the forestry resources of Ontario, in a brief submitted in behalf of a number of property owners in Markham township whose properties are near the headwaters of the Rouge River. The Rouge is a small river draining into Lake Ontario a few miles east of Toronto and long ago was an important factor in lumbering operations along this north shore. Like practically all Southern Ontario, the valley of the Rouge was originally covered with choice red and white pine. Much of the original forest was slashed down and burned in the interests of early agriculture. Mr. Bauden said it was a "complete waste of money," in referring to the present policy of supplying trees free for reforestation in Southern Ontario. He advocated the government buying up the headwaters of the streams and gave many reasons as to why any other policy would take too long and quite likely be barren of satisfactory results.

The Ontario division of the Canadian Manufacturers' Association expressed the belief that a constant long-range policy, developed through consultation and with the cooperation of those best able to advise is required and that such a policy should be designed to recover much of that which has been lost in the past, both in agriculture and forestry. There should be carefully considered measures based on the principal of conservation for use, perpetuation of forest resources, and through intelligent and persistent publicity the promotion of public sentiment, according to the manufacturers' viewpoint. The association noted with satisfaction that the government was convinced of the need for revision of the forest conservation policy and that $5 million had been provided for enlarged insect control, as well as for conservation and reforestation measures.

Robson Black of the Canadian Forestry Association, Montreal, told the commission that the final report "may fail unless backed by public knowledge of its contents and a vigorous popular expression thereon. The task of the commission will not be completed until means are found to inform the people of Ontario of the essential facts and implications. We urge that this commission should be promoted under non-government auspices so that the impartial attitude of the commission may retain its full quality in the course of public interpretation." Mr. Black urged that an understanding of forestry should be a first requisite of every child's school training.

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PAPER

Wisconsin Mills For Holiday

APPLETON, Wis.—All paper mills in Wisconsin were closed for the Christmas holiday, some of them for the entire week, except for repair operations. Among these were:

Bergstrom Paper Company, Neenah, which closed at noon, December 24, to reopen at 11 o'clock Wednesday evening, January 1. Offices were open except for Christmas and New Year's day.

Neenah Paper Company closed last week, except for the office, but scheduled to work this week.

Gilbert Paper Company, Menasha, which closed December 24 for a 7-day holiday, except for offices.

All Kimberly-Clark mills closed December 24 to the morning of December 26. There was a 24-hour shutdown for New Year's day.

Marathon Corporation closed at noon December 24, resuming operations December 26.

Neenah Foundry closed December 24 and 25.

George A. Whiting Paper Company, Menasha, closed all last week and expected to be down all this week for major repairs.

John Strange Paper Company, Menasha, closed for 40 hours, beginning at noon December 24.

George Banta Publishing Company, Menasha, closed from 4 o'clock in the afternoon of December 24, resuming work at 8 o'clock in the morning of December 26.

Consolidated Water Power and Paper Company, at its various mills, and Nekoosa-Edwards Paper Company, Nekoosa and Port Edwards, closed from 3 o'clock Tuesday afternoon to 7 o'clock Thursday morning.

Marathon Gives Dinner For Its Old Timers

MENASHA, Wis.—Ten employes who retired recently from service with Marathon Corporation were honored December 16, at a dinner at Hotel Menasha. Their combined service totaled 354 years.

Charles Mason, Neenah, led the group in length of service—more than 46 years. Others of the retired employes who attended the dinner were Fred Gallau, John Baenke and William Kruse, Neenah; Peter Borenze, Patrick Curtin, Henry Landskron, Michael Small, Bert Smith and Joseph Resch, all of Menasha.

Other Marathon employes who were for years associated with those who had retired also attended the dinner. They were Roy Sund, vice president in charge of manufacturing; Win Graebner, Menasha plant manager; Walter Strong, employe service manager; Charles Wagner, Norm Foley, Al Baenke, Frank Staniak, Les Remmel, Florian Shedgick, Carl Diehl and LaVern Gilbertson.

Stone Container Stages Party at Franklin

FRANKLIN, Ohio—The Stone Container Corporation entertained employees of the Franklin Division, formerly The Franklin Board & Paper Company, on December 15th at a buffet luncheon. During the festivities, each employee was presented with a Christmas bonus check representing ¼ to 1 per cent of annual wages according to seniority.

A pleasant surprise was created in the announcement of the Ten Year Club whereby forty-eight employees, having been with the old company ten years or longer, were presented with Benrus wrist watches. This was of particular significance in view of the Stone Container Corporation having had control of the property only since July 27th of this year.

The appreciation of the employees was promptly reflected in the presentation of individually monogrammed pen and pencil sets to officers of the company by Frank Nemcic, President of Local No. 55 of Paper Workers Organizing Committee C.I.O. At the same time remembrances were presented to S. F. Whitesel, manager, Ed. Fitzgerald, superintendent, and F. B. Zartman, past-president and present consultant.

L. S. & W. Staff Holds Annual Xmas Party

WORCESTER, Mass. — The annual Christmas party of the Logan, Swift and Brigham Envelope Co., with 50 employes attending, was held December 19 in the Town Club. Employes who participated in the entertainment program were Philip N. Dow, Axel H. Hakanson and Miss Dorothy Barber.

Donald Benjamin and John McCabe, representing the U. S. Envelope Co. central office in Springfield, were special guests.

In charge were Leonard Goodwin, chairman, Misses Doris Blair and Gertrude E. Daw.

Paper Goods to Give Christmas Bonus

BERLIN, Conn. — American Paper Goods Company, announced today that it will give Christmas bonuses to its employes. The company will present a week's wages to employes who were on the payroll prior to November 26, 1945; half a week's pay to those on the payroll before August 26 of this year, and $5 to employes hired since that time.

Wisconsin Trade Elects Schrage

MILWAUKEE—E. A. Schrage, president of the Universal Paper Company of Appleton was elected president of the Wisconsin Paper Trades Association at a recent meeting in Milwaukee. He was also named a director of the National Paper Trades Association.

Scott Awards Prizes At Christmas Party

PHILADELPHIA—Three Scott Paper Company employes were named "reporters of the year" by the Scott Tissue Broadcast, Monday night last. Olaf Frandsen of the Paper Mill; James Conaway, safety manager, and Mrs. Marie Jackson, of the cafeteria, were honored at the Broadcast's annual dinner at Walbers on the Delaware.

More than forty persons, most of them inter-departmental correspondents for the employe publication, were present at the dinner party. Also present were plant executives, local printing officials and newspaper reporters.

Christmas Service Awards ranging from $5 to a maximum of $50 are being presented to all Scott Paper Company employes, depending upon their length of service with the company.

In an announcement made this week to the Scott workers, the 1946 service award will go to employes who joined the firm even as recently as December 14, 1946.

All Scott employes who joined the company before January 1, 1942, receive $25 plus $1 for each year of continuous service following the first full calendar year of employment.

Each employe who joined the company on or after January 1, 1942, and not later than December 31, 1943, receives $25. Those who joined the firm during the year 1943 receive $20 Christmas awards; those employed during 1944 receive $15, with $10 going to those hired in 1945 and $5 to the workers now in their first year with the paper company.

There are approximately 1600 employed in the Chester plant and office of the company.

Christmas Parties Keep Holyoke Hotel Busy

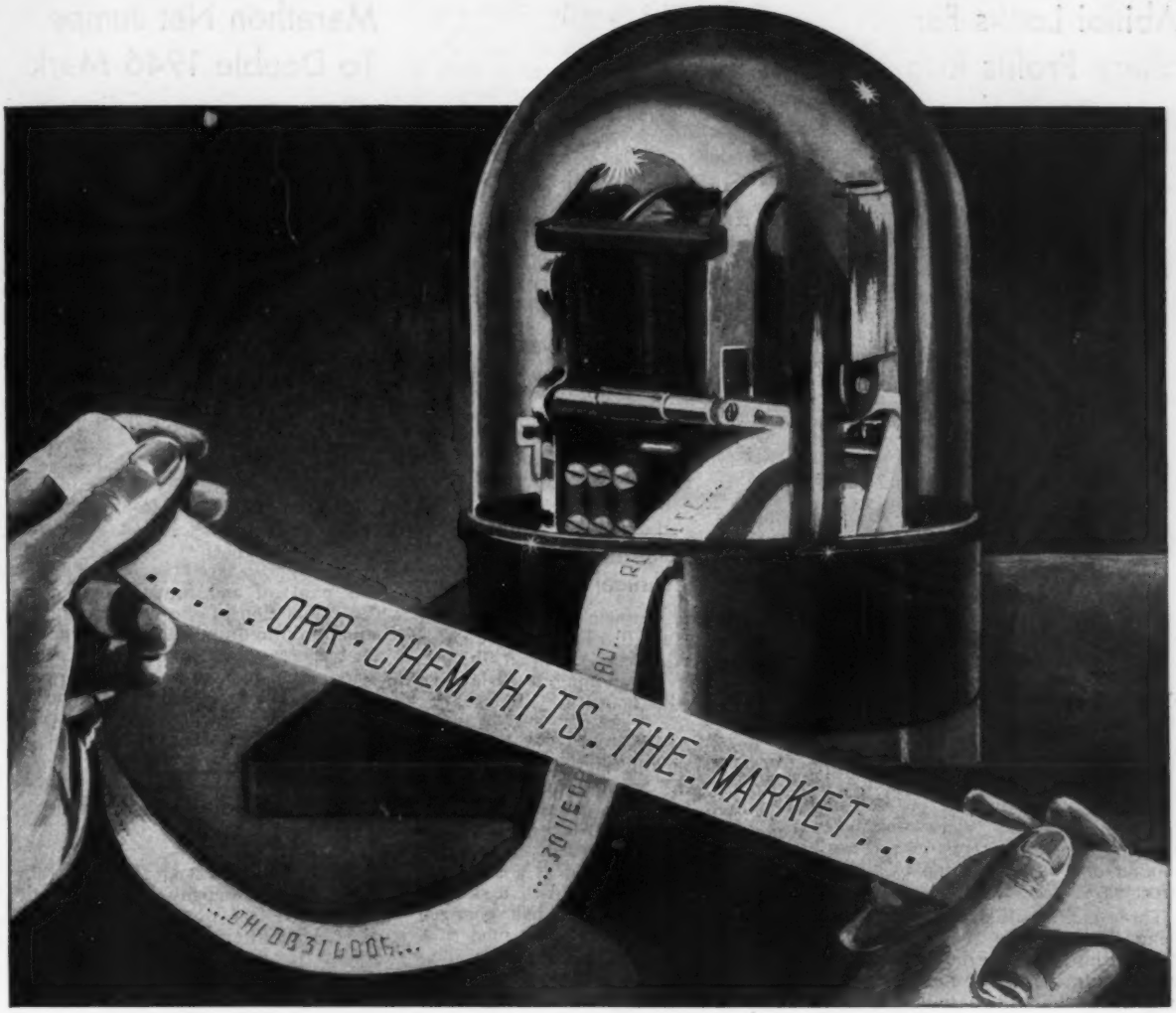
HOLYOKE, Mass.—Numerous Holyoke paper industries have scheduled Christmas parties for their employes at the Hotel Roger Smith during the holiday season.

Last week, the American Tissue Mills entertained about 150 of its employes; the American Writing Paper Corporation, about 400; the Hazen Paper Company, 60 persons; White and Wyckoff, 350 persons; National Blank Book Company, 350; New England Container Company, 150.

Hampden Glazed Paper Company held a party for 60 persons, rounding out the party schedule.

Badger Mills Pays Bonus

KAUKAUNA, Wis.—A bonus of about $100 has been paid to each person employed at the Badger Tissue Mills, according to L. F. Nelson, president. The bonus was given to each person at the rate of five cents for each hour worked during the year.



NEW FELT AMAZES SUPERINTENDENTS

Five years of search by Orr for a way to make felts wear longer led to the development of special equipment — equipment designed so to treat a felt that the chemical used actually becomes a part of the fibre and cannot wash out — a treatment that is positively permanent.

ORR-CHEMs, sent to virtually all Miami Valley mills for trial, had astonishing results. Today over 100 mills—on almost all grades—are regular users.

PERFORMANCE CHARACTERISTICS OF ORR-CHEM FELTS

How about porosity? There is actually faster drainage, hence far less suction or shower water required. *Does chemical wash out of the fibres?* It does not, whatever time felts are on or number of washings. *How about shrinkage or stretch?* When put on the machine straight, felts hold their position, and machine-wise stretch or contraction or cross shrinkage is less than normal.

Remember — 100 superintendents "in the know" are enthusiastic about ORR-CHEMs and are standardizing on them. They realize that at last new, better and more economical felts actually have arrived. Write Sales Department for further particulars, including many case histories.

THE ORR FELT & BLANKET CO.
PIQUA, OHIO

ORR-CHEM

Abitibi Looks For Sharp Profits Rise

TORONTO — Abitibi Power & Paper Company operations for the year 1946 are expected to show a sharp increase in output and both operating and net profits over 1945. These results are indicated by a substantial increase in the volume of both newsprint and pulp sales, and by the higher prices obtained for all Abitibi products. The higher ratio in itself has had the effect of cutting down the unit cost of production, apart entirely from the higher price available. It is understood the newsprint mills have been operating at full capacity for the second half of the year. In the first half of the year, with ample pulpwood available, operations were at 100 percent of capacity, except that one newsprint machine at the Sault Ste. Marie mill was down. It has been in operation throughout the last half of the year.

So far as production of bleached sulphite pulp is concerned at the Mattagami mill, a scarcity of chlorine earlier in the year for some time forced production of unbleached sulphite pulp, instead of bleached, at a slightly lower profit per ton. The supply of chlorine is now available and full capacity operations are going on in production of bleached sulphite at the annual rate of some 60,000 tons. Sharp advances in prices took place twice during the year just closing with another one of $7.50 a ton to go into effect as of Jan. 1, 1947.

Three and a half million dollars are being spent at the two centers. At Port Arthur, where ground wood pulp was being made at two mills, the company is spending two million dollars to concentrate operations at one mill. This change, along with others, will result in an increase of about 25,000 tons of newsprint and lower costs. The Sturgeon Falls newsprint mill which has not been operating since 1935, is now being changed over to manufacture corrugated boards at a cost of approximately one and one-half million dollars. The work will be completed some time during 1947. It is being delayed somewhat by the general scarcity of building materials and equipment. It is expected to produce 100 tons a day of corrugated board. New equipment is also being installed at the Smooth Rock Falls plant of Abitibi. Alkaline diffusion equipment will cost $300,000 in the bleach department of the bleached sulphite mill which is scheduled to begin operations by the spring of 1947. This new installation will give the plant a four-stage bleaching system comprising direct chlorination, alkaline diffusion and two stages of hypo-chlorite bleaching.

Bathurst Meeting Called To Set Technical Price

TORONTO, Ontario—A special meeting has been called by Bathurst Power & Paper Company, Limited, for the purpose of sanctioning a by-law enacted by the board of directors recently.

A letter signed by President R. L. Weldon explains that when the letters patent were granted in 1928 it was required to state a maximum and minimum price for which no-par-value shares might be issued. The prices were accordingly fixed at a maximum of $5 and a minimum of $1 a share.

Since then, practice has changed, and the company will now modernize this clause, and take the power to fix the consideration for such 500,000 shares at a maximum of $2,500,000 "or such greater amount as the board of directors . . . may deem expedient."

Marathon Net Jumps To Double 1946 Mark

ROTHSCHILD, Wis.—Net income of the Marathon Corporation for the year ended with last October was $2,734,-034, equal to $1.91 each on $1,300,000 shares of common stock outstanding. This is more than double the $1,360,-437 earned in the preceding fiscal year.

Net sales reached a new high of $33,244,137, an increase of $1,303,440 over the volume transacted in the year ended on October 31, 1945, D. C. Everest, president and general manager, informed shareholders.

The 400,000 shares of $12.50 par common stock outstanding at the beginning of the year were split two-for-one and with a stock dividend of 10 per cent, increased the total issue to 880,000 shares, Mr. Everest said. The sale in June of 420,000 shares increased the total common stock outstanding to 1,300,000 shares. From the proceeds, $10,000,000 of funded debt was paid off and funds provided for the completion of the company's Canadian pulp mill and other construction, the report points out. It is expected that the common stock of the corporation will be admitted to trading on the New York Stock Exchange next month, Mr. Everest said.

Strathmore Sales and Profits Rose for Last Year

WEST SPRINGFIELD, Mass.—Strathmore Paper Company reports for the year ended Oct. 31, 1946, a net profit of $223,568 after all charges, including federal taxes of $156,000. This compares with net a year ago of $198,585, after taxes of $140,000.

Net sales were $5,035,292 compared with $4,162,255 the previous year.

FINANCIAL RECORD OF THE WEEK

New York Stock Exchange

High, Low and Last for Week Ending December 28, 1946

STOCKS

	High	Low	Last
A. P. W.	5	4⅞	4⅞
Armstrong Cork Co.	50½	49¼	50⅛
Celotex Corp.	28⅜	27⅜	28¾
Celotex Corp., pf.	20½	20½	20½
Certain-Teed Products Corp.	20⅛	19⅝	20⅛
Certain-Teed Products Corp., pf.	....	....	....
Champion Paper & Fibre Co.	25½	24¼	25
Champion Paper & Fibre Co., pf.	111	109¾	111
Congoleum Nairn Co.	28½	27¾	28
Container Corp. of America	47½	46⅞	47
Crown-Zellerbach Co.	32⅝	31⅜	32⅝
Crown-Zellerbach Co., pf.	106	105½	105¾
Dixie Cup Co.	31¼	30	30½
Dixie Cup Co.—A	52¼	52	52
Flintkote Co.	35⅞	32¾	34½
Flintkote Co., pf.	....	....	....
Robert Gair	7½	7	7⅛
Robert Gair, pf.	21	20⅞	21
International Paper Co.	55¼	52½	52⅝
International Paper Co., pf.	104½	103⅝	103½
Johns-Manville Corp.	135½	130	130
Johns-Manville Corp., pf.	122	122	122
Kimberly-Clark Corp.	25	22½	22½
Mac Andrews & Forbes	....	....	....
Mac Andrews & Forbes, pf.	142	140	140
Masonite Corp.	62½	62¼	62¼
Mead Corp.	21	19¾	20½
Mead Corp., pf. 4¼	103½	103	103½
Mead Corp., pf. 2	50¾	47¾	48¼
National Container Corp.	37⅞	36¾	37¼
Paraffine Companies, Inc.	81	79½	81
Paraffine Companies, Inc., pf.	107	106¼	106¼
Rayonier, Inc.	26¾	25¼	25¾
Rayonier, Inc., pf.	35⅞	35½	35½
Ruberoid Co.	57	56	56
Scott Paper Co.	49	47	49
Scott Paper Co., pf.	100	100	100
Sutherland Paper Co.	46½	45½	45½
Union Bag & Paper Corp.	30⅞	30	30¾
United Paperboard Co.	14	13½	14
U. S. Gypsum Co.	110½	107	107
U. S. Gypsum Co., pf.	188	187½	188
West Virginia Pulp & Paper Co.	40½	39	39¾
West Virginia Pulp & Paper Co., pf.	....	....	....

BONDS

Abitibi Pulp & Paper Co. 5s '53	....	....	....
Celotex Corp. 3½s '60	103	103	103
Certain-Teed Products Corp. 5½s '53	....	....	....
Champion Paper & Fibre Co. 3s '65	....	....	....
International Paper Co. 5s '47	....	....	....
Mead Corp. 3s '66	....	....	....

New York Curb Exchange

High, Low and Last for Week Ending December 28, 1946

STOCKS

	High	Low	Last
Great Northern Paper Co.	44¼	42½	44
Hummel-Ross Fibre Corp.	27	25⅞	26¼
St. Regis Paper Co.	10¼	9½	9⅝
Taggart Corp.	8½	8½	8½

BONDS

American Writing Paper Co. 6s '61	....	....	....

"PRODUCTS FASHIONED FROM GROWING TREES TO SERVE ESSENTIAL INDUSTRIES"

"You mean to tell me this is a **plastic**...*made by St. Regis...out of* **paper**?"

Yes, lady, the inside door panel of your refrigerator is probably Panelyte, the St. Regis structural plastic made by laminating resin-impregnated sheets of paper under terrific heat and pressure.

This dramatic material, combining strength with light weight, is easy to clean, and is ideal for keeping cold *in* and heat *out*. Molded Panelyte door panels and door moldings are standard equipment on practically every well-known make of refrigerator—first, for insulating value; second, for beauty and durability. Panelyte lids are used on home and commercial freezers. Colorful, practical table tops are made of Panelyte also, as are fabricated parts in radio, automobile and electrical equipment.

But Panelyte is only one of many St. Regis "paper products" making useful but often unnoticed contributions to better everyday living.

Hundreds of foods, chemical and building products—as well as plastic molding compounds—are shipped in heavy-duty St. Regis Multiwall paper bags.

Telephone directories, popular magazines, and mail order catalogs are printed on paper which St. Regis makes "from the ground up"—starting with its own timberlands and proceeding through its pulp mills, paper mills, and paper converting plants.

The steadily rising demand for St. Regis products is being met by continued expansion of production and research facilities . . . to provide more and better St. Regis wood-cellulose products to meet the essential needs of twenty-one basic industries.

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St. Regis Products are sold by St. Regis Sales Corporation:
Offices in NEW YORK · CHICAGO · BALTIMORE · SAN FRANCISCO and 20 other industrial centers
IN CANADA: St. Regis Paper Co. (Can.) Ltd., Montreal

PRODUCTS: St. Regis "Tacoma" bleached and unbleached Sulphate Pulp . . . Multiwall Bags and Bag-filling Machines . . . Printing, Publication and Specialty Papers . . . Panelyte—the St. Regis Structural Laminated Plastic.

Wisconsin Hears Arguments On Cutting Restrictions

MILWAUKEE — Dozens of witnesses at a hearing conducted here Monday, December 9, by the Wisconsin Conservation Commission favored enactment of a bill to halt the cutting of immature timber. Some opposition was expressed but the majority of those attending supported the legislation.

Charles F. Smith, Wausau, Wis., a member of the commission, said that only twenty percent of the wood used by the state's paper mills has been supplied by Wisconsin forests.

"Unless the cutting of immature trees is controlled, even this will be destroyed and with the end of the paper industry in Wisconsin fifty thousand persons will be out of work." He saw the danger of cities like Wausau, Stevens Point and Wisconsin Rapids becoming ghost towns in twenty years.

Arthur Molstad, president of the Milwaukee Conservation Alliance, urged strong pressure for the proposed legislation. "This generation will be guilty of a crime if it does nothing to save our timber resources," he said.

M. N. Taylor, of Merrill, Wis., executive director of Trees for Tomorrow, Inc., sketched Wisconsin's paper and pulp industry as follows:

There are 48 mills with a capital investment of $322,000,000 and annual sales of $311,000,000. With 17,000 workers, the industry ranks second in Wisconsin in wage earners and third in value of products.

Nine communities in the state, Mr. Taylor said, "are ninety to one hundred dependent on the paper and pulp industry; six are fifty to ninety percent dependent on it, and five are up to fifty percent dependent. He added that all pulpwood used could be grown on a small part of Wisconsin land suited for forestry purposes.

Joseph Stosckler, a forester from the Lake States Forest Experiment Station at St. Paul, Minn., estimated that only one-fourth of timber in Wisconsin is cut properly.

W. J. P. Aberg, a conservation commissioner, urged Wisconsin to follow the example of forestry management set in Germany and Sweden, where the forests are "farmed selectively and in perpetuity."

S. W. Allen of Ann Arbor, Mich., president of the American Society of Forestry, described the Wisconsin bill as "a firm but friendly challenge to the owner who proposes to abuse a forest."

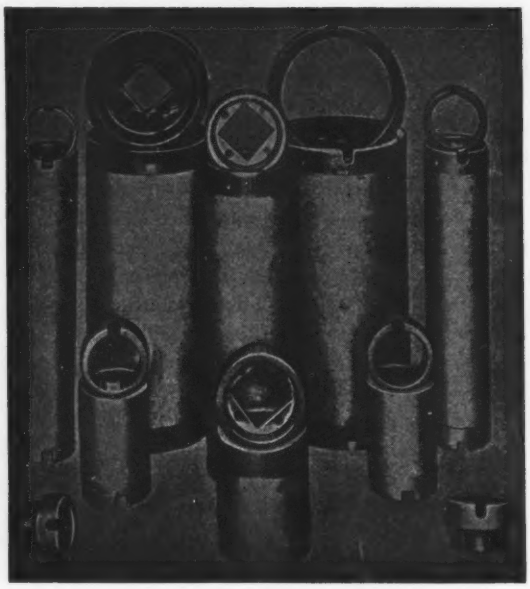
NEPMA Holds Meetings In Connecticut

BOSTON—Two important and timely local group meetings of The New England Paper Merchants Association, comprising 92 member houses, Fine and Wrapping, throughout New England were held December 10 at New Haven Country Club, at noon, and Hotel Bond, Hartford at night. Thirty members from Bridgeport, Stamford and New Haven gathered for the luncheon meeting at New Haven Country Club. In the evening about the same number of members, from Springfield, Holyoke, Waterbury and Hartford were present at the dinner meeting at Hotel Bond, Hartford.

Speakers at both meetings, chairmanned by F. W. Holden, were W. G. Leathers, assistant secretary of National Paper Trade Association, New York; J. J. Dwyer, P. M. Jones and N. E. Scott, executive secretary of NEPMA. The subjects discussed were of current interest and importance, locally and nationally, to all members.

Dillard Votes Bonuses

ROANOKE, Va.—A dividend of eight per cent for stockholders and a five per cent bonus for all employes was voted December 21 by the board of directors of the Dillard Paper Company. A Christmas-New Year's party was held for employes at Hotel Patrick Henry December 27.



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Straight wound paper cores made in sizes from 2" to 10" inside diameter with any thickness wall required.

Long draw protected slot caps of heavy gauge steel in all standard sizes.

Heavy duty caps with reenforced square hole. This patented feature of reenforcement gives added strength and durability.

CORES

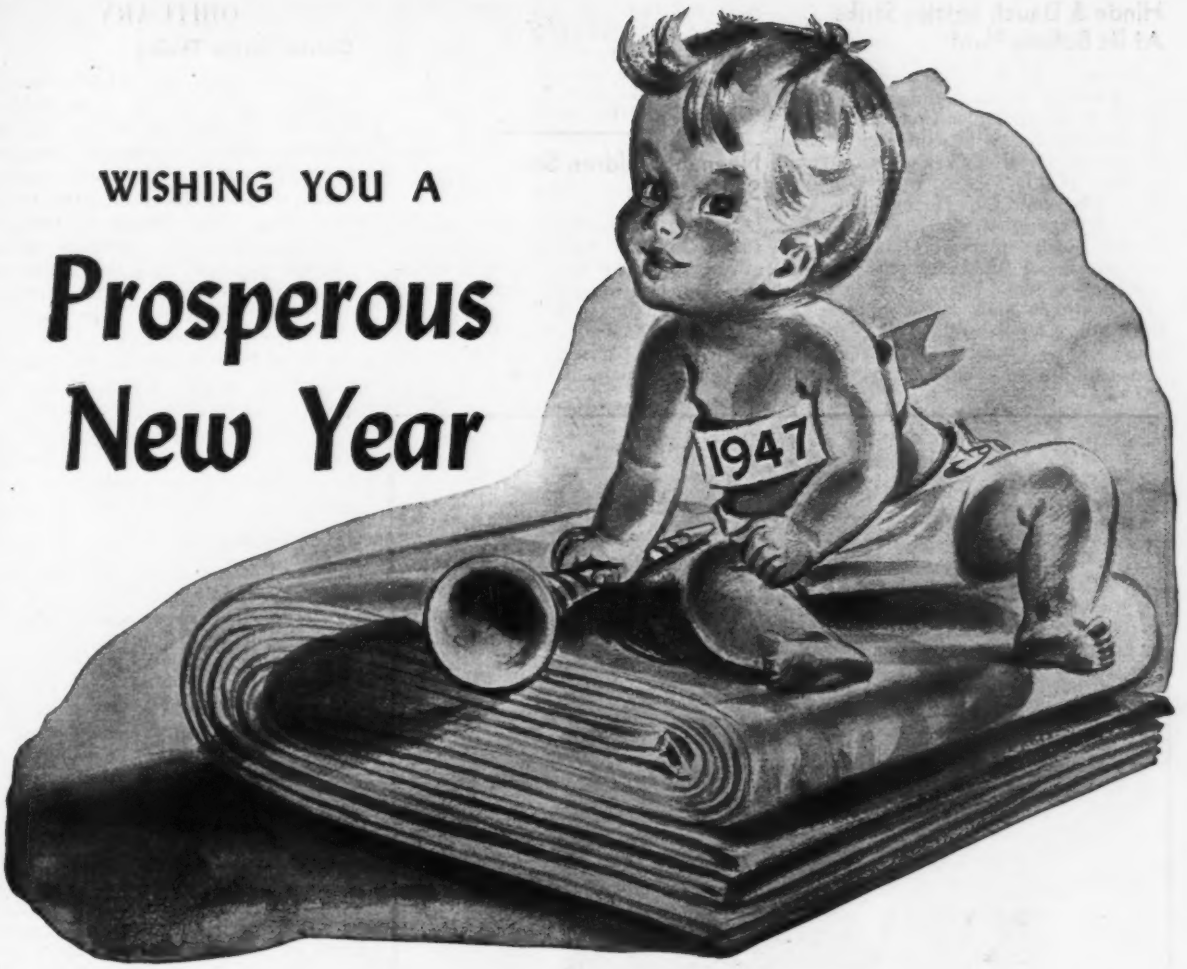
Samples of caps or cores will be gladly submitted

ELIXMAN PAPER CORE COMPANY, INC.

CORINTH, N. Y.

WISHING YOU A

Prosperous New Year



Notwithstanding shortages of materials, rising costs and all the tribulations that confront the manufacturers of paper and board, the men and women who make Hamilton Felts extend to those who use them cordial greetings and best wishes for a prosperous New Year.

Hamilton Felts will contribute directly to the prosperity of the industry by increasing tonnage output, reducing fuel consumption and preventing needless unproductive time for your paper machines. In the year to come as in decades past there will always be Hamilton Felts that will do your work better, faster and at lower cost.

SHULER & BENNINGHOFEN, HAMILTON, OHIO

• Miami Woolen Mills •

Hamilton Felts

• Established 1858 •

Hinde & Dauch Settles Strike At Its Buffalo Plant

BUFFALO, N. Y. — Settlement of a strike which began October 1 at the Hinde & Dauch Paper Company plant, 30 Scoville St., will send eighty employes of Local 134, United Paperworkers (CIO) back to work January 6th. The contract, Harry Buckeye, U.P. international representative, Joseph Lovas of the CIO field staff, and Alexander M. D. Martin agreed, calls for a general wage increase of 13½ cents an hour, double time after eight hours on Saturday and after 12 hours on week days. The agreement also calls for six paid holidays and one- and two-week vacations for one and five years of service.

The union membership ratified the agreement at a meeting in Dom Polski hall. It is the first contract between the local and the company.

Neenah Children See Santa Claus

NEENAH, Wis.—Children of Neenah Paper Company employes were entertained at a Christmas party Tuesday morning, December 17, at the Neenah theater, joining with the children of Bergstrom Paper Company employes for a two-hour program of movies and a visit from Santa Claus.

You can't miss with W. G. P.

It's a fact . . . you can't miss with Walker-Goulard-Plehn. For our background of 91 years of continuous service, our reputation for reliability, and our energetic, alert staff of paper specialists make a combination that's hard to beat. Because of this W. G. P. commands a great volume of business in paper and board products, both in the domestic market and export field.

W. G. P. is vitally interested in making additional mill connections—both for the present and the future. If any of your output is available for the domestic or export markets, write us at once. Or, we'd be glad to sit down with you *now* to discuss or conclude a working agreement for the future.

W.G.P.

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TISSUE AND BOARD • LAMP SHADE SPECIALISTS • MUSIC PAPERS
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. . . . . EXPORTS TO ALL PARTS OF THE WORLD . . . . .

OBITUARY

Charles Burton Thwing

PHILADELPHIA — Charles Burton Thwing, Ph.D., pioneer in the field of pyrometry and president of the Thwing - Albert Instrument Company, manufacturers of scientific instruments, died December 12, 1946, in his 87th year. Born March 9, 1860, at Theresa, N. Y., Dr. Thwing was an eminent physicist and the holder of numerous patents in the field of thermo-electricity. A graduate of Northwestern University and the University of Bonn, Germany, Dr. Thwing was active in the field of education prior to entering business.

Included in Dr. Thwing's research was early work in the development of the electric light and wireless. He also formulated Thwing's Law on capacity.

J. Lea Fearing, Jr.

ALLENTOWN, Pa. — J. Lea Fearing, Jr., manager of the local office of the St. Regis Sales Corporation, subsidiary of the St. Regis Paper Company, died in White Plains, N. Y., on December 17, after a short illness. He was 45 years old.

Mr. Fearing was a member of a family which has been prominent in the paper industry in the United States for many years. His father, the late Joseph Lea Fearing, was a vice-president of the International Paper Company.

Following his graduation from Harvard, Mr. Fearing became associated with the International Paper Company. Later he joined St. Regis Paper, first covering various territories in the Chicago area. Subsequently he was made manager of the St. Regis office at Allentown, where he had a wide group of friends in the cement companies in the Lehigh Valley.

Warren E. Brooks

MILWAUKEE, Wis. — Warren E. Brooks, 76, former vice-president of the Wisconsin Valley Improvement Company, Wausau, Wis., and a member of its board of directors, died December 22 at the home of his daughter Mrs. Fred Boyce, Jr., in this city after a long illness.

He was a former manager of the company, retiring as vice-president in 1941. He and Mrs. Brooks moved here from Wausau last summer. He was born in Medford, Mass., and was graduated from the Worcester Polytechnical Institute, coming to Wisconsin in 1904. He entered the lumber business at Tomahawk. He served as resident engineer of the construction of King's dam on the Wisconsin river at Tomahawk.

Survivors include the widow, two daughters, Mrs. Boyce and Mrs. Lawrence Bernhardt, New York; a son, Luther, Indianapolis, Ind., and five grandchildren.

We'd have no wood at all . . .
if it weren't for *decay*

No matter how it seems, decay isn't *always* a villain. As Harry D. Tiemann, senior wood physicist at the U. S. Forest Products Laboratories said, "Think what a forest would be like if wood did not decay. As trees were blown down by wind and felled by ice storms and fire, such an accumulation of jackstraws would occur in a few years as to make the forests impassable . . . Fire would no doubt enter periodically . . . which would soon exterminate the forest completely."

Decay may be a good servant . . . but it is a bad master. It does almost incalculable damage to structures . . . *and the tragic part is that this loss can be largely avoided.* Koppers pressure-treatments can fortify wood against this enemy, as well as against termites, marine borers, acid attack and fire. You'll find the complete story on treatments available, and where pressure-treated wood is serving and saving, in our book "Economical and Permanent Construction with Pressure-treated Wood." Ask for a copy.

K
KOPPERS

PRESSURE-TREATED WOOD

KOPPERS COMPANY, INC.
Pittsburgh 19, Pa.

Canada's Operators Seek More Secure Tenures

(Continued from page 9)

such as the conservation of soils, water power, wild life, recreation and tourist trade.

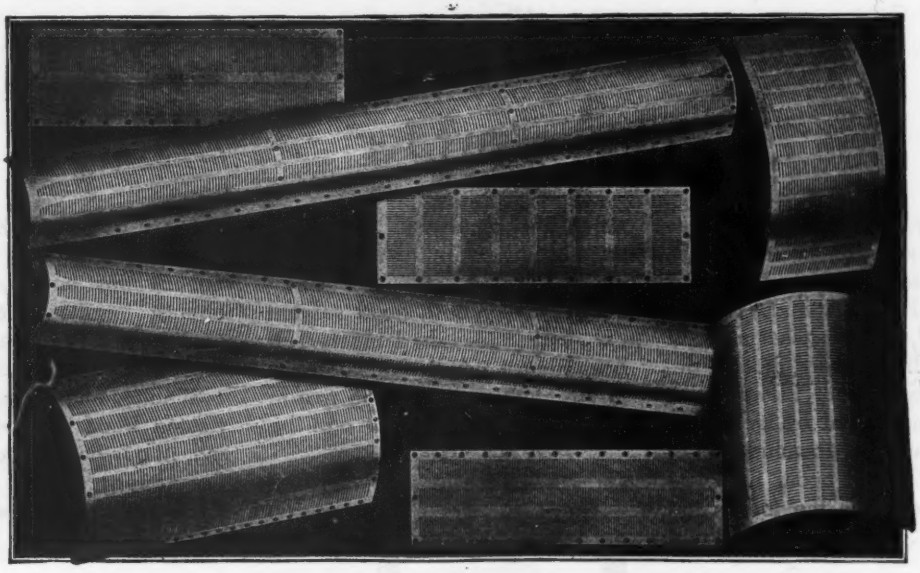
The brief suggested that adequate government funds should be provided to assure extension of forest fire protection such as the completion of the look-out tower system; for road building to give speedier access to fire; extension of telephone or radio facilities; improved equipment and a larger permanent staff. The brief went on to point out that the average annual loss from fire, 1934-43, was 14.5 per cent of all timber cut; from insects and disease, 21.6 per cent; for every cubic foot cut another 36 feet were destroyed; 983,792 acres of forest land damaged or destroyed by fire from 1939-43; value $3,241,255; average number of fire per year 1,220; fire-fighting cost over and above permanent staff, $2,285,000.

It was suggested that construction of permanent dams, log chutes and roads should be a part of the government's plans to promote the full utilization of forest resources. Once roads are established, more intensive forestry practices can be introduced and the industry operated more in the manner of managed forests in other countries. Another interesting suggestion in the brief was that no lands be opened for agricultural settlement without a previous scientific classification to determine their suitability and the non-arable lands be reserved for forest crops. It was pointed out that lands which once sustained some of the finest virgin timber stands were cleared to make farms, which, at best, are marginal, and at worst have become unoccupied waste lands. Ontario has 5,899 square miles of "agricultural land" which is now unoccupied and covered by grass or brush. This is the equivalent of 37,753 farms of 100 acres each.

The brief went on to state that proper forestry policy demands modern schools for training forest experts; the long-range objectives of such policy should be brought to the attention of the people of Ontario. Enlightened forest policy is going to cost more and the taxpayer must know why. Forestry research should be pressed in the interests of economy and efficiency to develop new uses for wood; measures to control destructive forest insects and tree diseases; breeding and selection of improved strains of trees. Research is essential to determine what silvicultural practice is necessary, to assure re-establishment of forest growth.

Reverting again to the losses from forest fires, the brief asked for the amendment of the Forest Fires Prevention Act so that "permitees" shall not be presumed guilty of fires occuring in their areas and assessed for costs of fighting such fires unless satisfactory evidence of responsibility is presented. They asked also that all forest legislation be consolidated in one statute. It was pointed out that except for a few years, government revenue from forests has consistently exceeded expenditures on management and protection and it was suggested that revenue derived from the use or for the protection and development of forest resources should be applied for constructive purposes aimed at the improvement and perpetuation of forest crops. Ontario forest lands are a capital asset which should be maintained and improved and direct revenues therefrom should be reserved for re-investment.

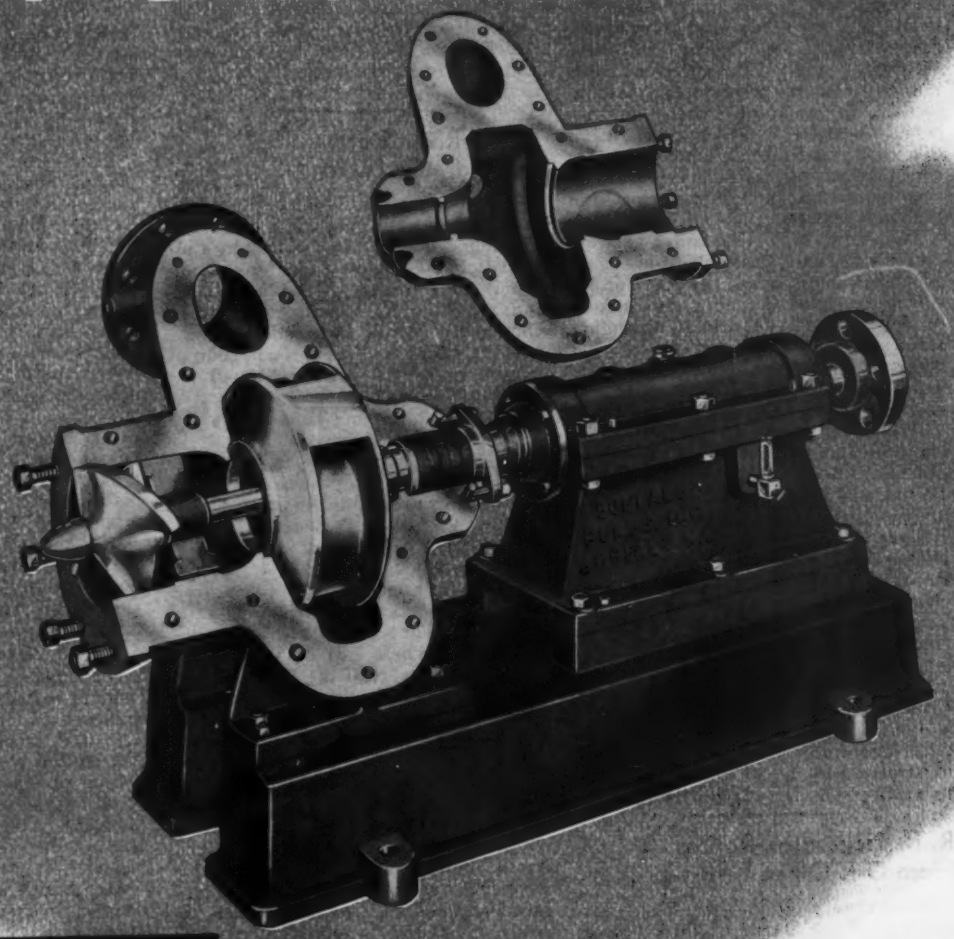
E. L. Johnson, president of Pigeon Timber Co. and Great Lakes Lumber and Shipping Co., of Fort William, presented a brief in which it was stated that much evidence had been produced before the commission charging the pulp and paper industry with enjoying a monopoly of the forestry resources of the Thunder Bay district and that he agreed with the contention. He submitted that before any new development or expansion of present mills should be permittted, all the timber interests now in existence should have sufficient raw material set aside for them to take care of their present installed capacities. Additional expansion of any mill at this time can only accentuate the problem of supply to existing mills. The exporting of pulpwood from Crown lands, Mr. Johnson said, also requires investigation in this connection. In many cases operators are cutting no jackpine, poplar or birch and are exporting substantial quantities of white spruce sawlogs as eight-foot pulpwood.



"HARDY" BRONZE and CHROME-NICKEL-STEEL SCREEN PLATES.

MAGNUS METAL CORP. FITCHBURG, MASS.

EASILY SERVICED NON-CLOGGING



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● When you put one of these husky Buffalo "DS" Stock Pumps to work handling high consistency stock, for dumping beaters, for head box service, feeding Jordans or moving "gassy" stock, you'll find it a "permanent fixture" in your mill. Every part is oversize . . . bearings casing, shaft, coupling, impeller and base . . . designed to function longer. For inspection or servicing simply remove upper half of casing, and rotor is exposed.

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Canada Pumps, Ltd., Kitchener, Ont.

New Bulkley Dunton Folio Features Display Materials

NEW YORK—A new Spring-Summer display folio, featuring Bulkley, Dunton's display and display-packaging materials and their suggested applications, is now ready for distribution. Selection and development of these materials have been accomplished through the cooperation of leading stylists, display and merchandising experts. All materials are available in an extensive range of colors and color combinations with special emphasis on shades forecost for the Spring and Summer seasons.

The new folio contains a wide array of media suitable for backgrounds, show cases, panels, props, columns, signs, banners, trays and scrolls, as well as display-packaging materials for gift suggestions and other similar uses. The majority of the items is designed for both window display and store-wide applications.

Bulkton Seamless, the versatile display medium, is featured in twenty different sales-tested colors in 85- and 107-inch widths. The center spread of the folio is devoted entirely to Bulkton Seamless and shows actual photographs of leading metropolitan stores using this material in their merchandising promotions. A new Levant Leatherette is shown for the first time, emphasizing the greatly improved qualities of this popular display medium. Other featured leatherettes are Crushgrain and Rhino.

Sparkling with new ideas and expert suggestions, the folio is cleverly illustrated and should be of great help to members of the display industry.

R. R. Richardson Retires From G-R Office

MIDDLETOWN, Ohio — At the recent meeting of the board of directors of the Gardner-Richardson Company, the resignation of R. R. Richardson as vice-president and secretary of the company was accepted. He will, however, continue to serve on the board of directors.

Colin Gardner III was elected to fill the office of secretary and W. W. McIntire was named director of purchases, both posts formerly held by Mr. Richardson. R. O. Brosius was elected to the office of assistant secretary.

Dexter Wins Writ on Assessment Protest

WATERTOWN, N. Y. — The Dexter Sulphite Pulp & Paper Company, which has each year for the past few years protested the assessments placed upon its real property by the assessors of Dexter Village, has obtained an order from Supreme Court Justice Henry J. Kimball for the return of a writ of certiorari against the village trustees and assessors at the supreme court equity term to be convened here Feb. 2.

The petition in case alleges that the assessed valuation of $694,250 placed on the property this year as a base for 1947 taxes is $469,375 more than the fair valuation of the land and buildings of the company. The company asks that the Supreme Court review all of the data and operations which have gone into the assessment and then order a cut to a fair valuation.

Powell River Starts Its Hydraulic Barker

VANCOUVER, B. C.—First hydraulic barker to go into operation in British Columbia, Powell River Company's installation will begin partial operation soon. Construction of the new barking plant began a year ago. When completed, it will have adequate capacity to handle all the wood required by the company's pulp mills and will effect a saving of approximately ten percent in wood consumption per ton of product manufactured.

As an additional step in the company's post-war program, a contract has been awarded to Dominion Engineering Co., Ltd., Montreal, for the manufacture of a new high speed newsprint machine. A contract for the electric paper machine drive has been awarded to Bepco (Canada) Ltd., Montreal. The contracts call for delivery in the first half of 1948.

Comprising part of the Powell River modernization program, the new machine will mean a moderate increase in newsprint manufacturing capacity. Some less efficient productive equipment will be retired from the manufacture of newsprint when the machine begins operation. The investment cost per daily ton of newsprint produced on this new machine will be very low due to the fact that necessary buildings and power facilities already exist for the installation and operation of this equipment.

May Soon Name Buyer of Quebec Pulp & Paper

MONTREAL, Que.—Premier Duplessis of Quebec is expected to disclose in a matter of days what group has been the successful bidder for the assets of Quebec Pulp and Paper Company now in bankruptcy. Despite rumors that he has already come to a decision on who will take this company out of bankruptcy, and on what terms, he has not yet divulged that information.

It is understood two groups have submitted bids, one originating in Montreal, the other in France.

Appleton to Build Quonset Hut

APPLETON, Wis.—Appleton Machine Company last week received a permit to construct a Quonset building to be used as a warehouse. The structure will be of metal construction measuring 40 by 100 feet. Cost is estimated at $4,500.

Ward Cited For Its Safety Record

MERRILL, Wis.—The second highest safety award in the nation for paper mills of its size has been made to the Ward Paper Company by the National Safety Council. This honor goes each year to a manufacturing firm with a high record for safety, based on the number and degree of accidents compared to the total number of man hours worked.

Fred Braun, vice president of Employers Mutuals, Wausau, made the presentation on behalf of the National Safety Council at a dinner dance given by the company recently for one hundred and eighty employees and their families. Al Koebe, safety committee chairman, accepted the plaque for the paper firm.

Completion of a 100 foot water tower at the Ward plant will provide a new industrial landmark in Merrill's sky line. Four huge pillars, which dwarf the men working on the top, will support a 50,000 gallon ball-shaped tank. The tower was erected to furnish water for an automatic sprinkling system which has recently been installed throughout the mill.

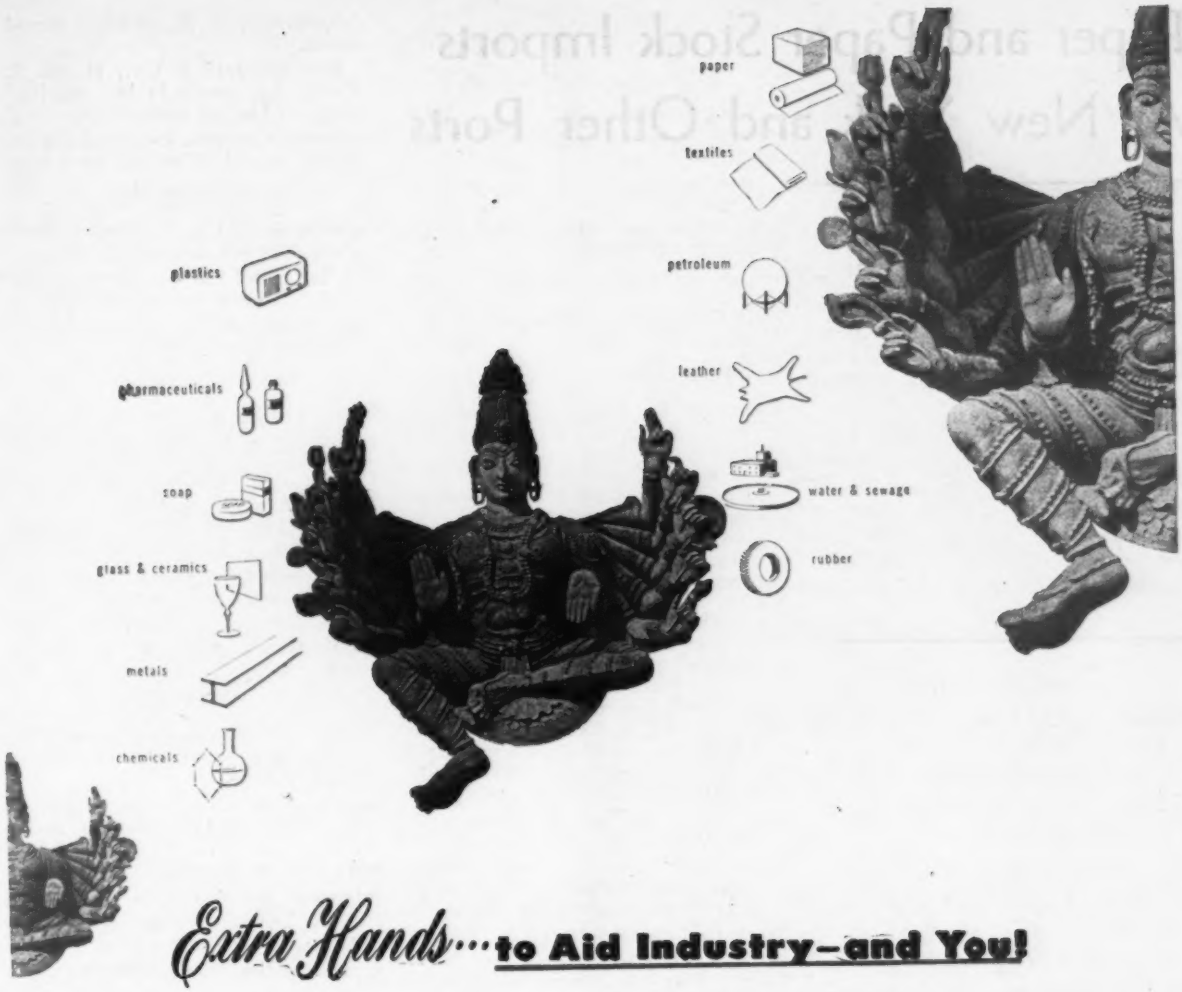
Projects completed include a new 80 by 180 foot finishing and converting building of concrete blocks with glass brick windows.

A new train shed, 40 by 235 feet, accommodates five railroad cars at one time. It is here that raw materials are unloaded and the finished paper products are trucked into the cars for distribution throughout the world. A roll-up door maintains a temperature equal to that in the mill on the loading platform. A major technical installation is the new three ton tile pulp bleacher.

Mr. Smith also said that a large number of changes have been made to improve working conditions and to effect more efficient operation. Towmotor and hydraulic lift trucks now eliminate heavy manual labor in shifting finished and partially finished paper products from one department to another. New electric platform trucks serve the same purpose.

Institute Qualifies for Surplus Property

APPLETON, Wis.—The Federal Works Agency on December 24 certified the Institute of Paper Chemistry as qualified to receive government surplus property, such as furniture and scientific equipment. John Strange, Institute secretary, said that the Institute has not applied for any specific equipment or apparatus but now may do so under the certification. The equipment is made available to the Institute and other schools under the Mead bill which provides that institution may apply for surplus properties if they are needed to facilitate enrollment of veterans. The Institute plans an enrollment of 44, of whom 41 are expected to be veterans.



Extra Hands··· to Aid Industry—and You!

HANDLING COMPLEX PROBLEMS in the chemical process industries makes many a purchasing and production executive wish he had as many extra hands as this ancient Hindu idol to help him through—*and he has!*

THEY ARE HIS... and yours—in the cooperation and assistance of chemists, engineers, and technicians on General Chemical Company's Technical and Engineering Service staffs. These experts are well qualified by technical training and by practical industry-wide experience to offer sound, constructive advice in many ways—whether your problems deal with industrial, scientific or agricultural chemicals.

THEY CAN FURNISH pertinent data on properties, grades, and packaging of General Chemical products . . . advise on materials and methods for handling and storing them . . . consult on their applications to your operations,..and work with you in the development of special chemicals to meet your individual requirements.

When "extra hands" such as these can help you, just phone or write to the nearest General Chemical Company Sales and Technical Service Office listed below.

GENERAL CHEMICAL COMPANY

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Sales and Technical Service Offices: Albany • Atlanta • Baltimore • Birmingham Boston • Bridgeport • Buffalo • Charlotte • Chicago • Cleveland • Denver Detroit • Houston • Kansas City • Los Angeles • Minneapolis • New York Philadelphia • Pittsburgh • Providence • San Francisco • Seattle • St. Louis Wenatchee (Wash.) • Yakima (Wash.)

In Wisconsin: General Chemical Wisconsin Corporation, Milwaukee, Wis.

In Canada: The Nichols Chemical Company, Limited
Montreal • Toronto • Vancouver

BASIC CHEMICALS
GENERAL CHEMICAL COMPANY
FOR AMERICAN INDUSTRY

Paper and Paper Stock Imports At New York and Other Ports

NEW YORK IMPORTS

WEEK ENDING DECEMBER 28, 1946

SUMMARY

Cigarette Paper ..... 50 cs.
Wall Paper ..... 1 cs.
Parchment Paper ..... 10 cs.
Drawing Paper ..... 2 cs.
Carbon Paper ..... 3 cs.
Decalcomania Paper ..... 41 cs.
Surface Coated Paper ..... 6 cs.
Photo Paper ..... 42 cs.
Wrapping Paper ..... 6 cs., 1144 rolls
Sulphite Paper ..... 283 rolls
Sulphate Paper ..... 225 rolls

CIGARETTE PAPER

Solleco Trading Corp., Terre Haute Victory, Alexandria, 50 cs.

WALLPAPER

Hudson Shipping Co., Halton R. Carey, Liverpool, 1 cs.

PARCHMENT PAPER

F. C. Strype, Inc., Midland Victory, Antwerp, 10 cs.

DRAWING PAPER

Stevens Nelson Paper Corp., George M. Verity, London, 2 cs.

CARBON PAPER

Mynol Chemical Co., Halton R. Carey, Liverpool, 3 cs.

DECALCOMANIA PAPER

B. F. Drakenfeld & Co., Vasconia, Liverpool, 41 cs. (duplex & simplex).

SURFACE COATED PAPER

Gevaert Co. of America, Inc., Midland Victory, Antwerp, 2 cs.; 4 cs. (baryta coatex).

PHOTO PAPER

Gevaert Co. of America, Inc., Midland Victory, Antwerp, 37 cs. (base).

(———), George M. Verity, London, 5 cs.

WRAPPING PAPER

Jay Madden Corp., Vretaholm, Helsingfors, 1028 rolls.

Jay Madden Corp., Mormacmail, Gothenburg, 116 rolls.

Meadows Wye & Co., George M. Verity, London, 6 cs. (waxed).

SULPHITE PAPER

F. C. Strype, Inc., Mormacmail, Gothenburg, 283 rolls.

SULPHATE PAPER

F. P. Gaskell Co., Mormacmail, Gothenburg, 225 rolls.

RAGS, BAGGINGS, ETC.

Padawer Trading Co., Middlesex Trader, Calcutta, 160 bls. cotton waste.

W. J. Green Co., Inc., Midland Victory, Antwerp, 249 bls. jute thread waste.

(———), Elysia, Glasgow, 62 bls. old cotton webbing.

Amtorg Trading Corp., Marshall Govorov, Leningrad, 6786 bls. cotton waste; 582 bls. cotton linters; 259 bls. cotton cuttings; 27 bls. old felt cuttings.

(———), Beatrice Victory, Pto Alegre, 12 bls. woolen rags.

Miller Wool Waste Co., Santa Olivia, Talcahuano, 39 bls. woolen waste.

Star Woolen Co., Santa Olivia, Talcahuano, 31 bls. woolen waste.

E. J. Keller Co., Inc., Honduras Victory, Venice, 431 bls. rags.

E. J. Keller Co., Inc., Terre Haute Victory, Haifa, 100 bls. mixed khaki rags; 86 bls. cotton khaki rags.

Manufacturers Trust Co., Exiria, Genoa, 243 bls. old waste bagging.

Empire Fibre Co., Ferncliff, Shanghai, 100 bls. cotton waste.

Railway Supply & Manufacturing Co., Ferncliff, Shanghai, 100 bls. cotton waste.

New England Waste Co., Ferncliff, Shanghai, 200 bls. cotton waste.

Kauders Steuber Co., Ferncliff, Shanghai, 50 bls. cotton waste.

C. Comiter Co., Ferncliff, Shanghai, 100 bls. cotton waste.

Ayres W. C. Jones, Inc., Ferncliff, Shanghai, 100 bls. cotton waste.

O'Brien Products, Inc., Ferncliff, Shanghai, 100 bls. cotton waste.

Riverside Mills, Ferncliff, Shanghai, 100 bls. cotton waste.

McKay & Co., Ferncliff, Shanghai, 200 bls. cotton waste.

Padawer Corp., Ferncliff, Shanghai, 100 bls. cotton waste.

J. J. Ryan & Sons, Inc., Mormacmail, Gothenburg, 83 bls. thread waste.

American Express Co., George M. Verity, London, 5 bls. paperstock.

E. Butterworth & Co., Halton R. Carey, Manchester, 65 bls. old bagging; 15 bls. old rags.

(———), Halton R. Carey, Manchester, 53 bls. old gunny bagging.

1st National Bank, Halton R. Carey, Manchester, 9 bls. woolen thread waste.

E. Butterworth & Co., Halton R. Carey, Liverpool, 34 bls. old bagging; 62 bls. old cotton rags.

(———), Vasconia, Liverpool, 34 bls. thread waste; 44 bls. old wool rags.

WOODPULP

Cellulose Sales Co., Vretaholm, Stugsund, 2990 bls. dry sulphite pulp.

Cellulose Sales Co., Vretaholm, Sundsvall, 1584 bls. dry sulphite pulp.

Pagel Horton & Co., Inc., Vretaholm, Gefle, 499 bls. woodpulp.

GLUESTOCK, ETC.

Polish Trading Co., Midland Victory, Antwerp, 200 bags animal glue (sheets).

J. Gorvers, Santa Leonor, Barranquilla, 269 bdls. dry hidecuttings.

Geismar & Co., Beatrice Victory, Santos, 152 bags boneglue.

J. Gorvers, Santa Cecelia, Callao, 15 bls. gluestock.

Darmstadt Scott & Courtney, Ferncliff, Manila, 107 bdls. dry hidecuttings.

CASEIN

Casein Co. of America, Division of The Borden Co., Mormacisle, Buenos Aires, 2155 bags.

American British Chemical Supplies, Inc., Mormacisle, Buenos Aires, 1000 bags.

F. H. Paul & Stein Bros., Mormacisle, Buenos Aires, 500 bags.

Paul A. Dunkel, Mormacisle, Buenos Aires, 1000 bags.

(———), Mormacisle, Buenos Aires, 1667 bags.

Parkes Overseas Agencies, Inc., Coastal Viking, Pt au Prince, 20 bags.

BOSTON IMPORTS

WEEK ENDING DECEMBER 28, 1946

Bank of New York Trust Co., Exiria, Genoa, 97 bls. old dark cotton rags.

PHILADELPHIA IMPORTS

WEEK ENDING DECEMBER 28, 1946

Cellulose Sales Co., Vretaholm, Stugsund, 125 bls. air dry sulphite pulp.

Cellulose Sales Co., Vretaholm, Sundsvall, 576 bls. dry sulphite pulp.

Jay Madden Corp., Vretaholm, Helsingfors, 489 rolls wrapping paper.

Bank of New York Trust Co., Exiria, Genoa, 62 bls. light cotton rags.

BALTIMORE IMPORTS

WEEK ENDING DECEMBER 28, 1946

Cellulose Sales Co., Vretaholm, Stugsund, 1985 bls. air dry sulphite pulp.

Cellulose Sales Co., Vretaholm, Sundsvall, 3480 bls. dry sulphite pulp.

Pulp Specialties, Inc., Mormacmail, Gothenburg, 386 bls. bleached sulphate pulp, 54 tons.

Week's Record of Trends in The Pulp and Paper Market

Office of the PAPER TRADE JOURNAL,
Tuesday, December 31, 1946.

Consumer's requirements for paper, paperboard and pulp continue heavy and remain substantially greater than available supplies in many cases. However, there are indications that regular customers in certain categories are receiving ample supplies at satisfactory prices. Much of the current excess demand is created by a country-wide expansion of business generally. In most cases, critical requirements for paper are being met. Mills are supplying consumers with more paper, board and pulp than ever before in their history, and are themselves continually increasing production. While production has yet to catch up with record demands, some trade quarters feel that the year 1947 will probably find production at least equal to demand and probably exceeding demand in some categories.

Meanwhile, many large pulp producers are becoming more and more conscious of the value of pulpwood salvage and relogging operations. Crown Zellerbach Corporation is relogging profitably a number of its tree farms; particularly its 50,000 acre Columbia County, Oregon, tree farm, where relogging, now in its second year, is on a year-round basis. St. Helens Pulp and Paper Company is successfully relogging a small cutover area. The Soundview Pulp Company is currently engaged in a similar operation. According to American Forestry Association estimates, maximum operations could yield 2 billion board feet of logs annually and indefinitely from salvage in the Pacific Northwest's Douglas fir belt alone. Many forests throughout this area are being combed for usable timber. Logging crews hunt out and cut rough, deformed trees passed by when the virgin forests were first cut over. Even fire-scourged timberlands are yielding available logs. Most pulp mills are turning to salvage from nearby cutover areas, and adopting other economy moves such as thinning of second growth stands, use of other species, and improvements of wood preparation in the mills. Logs as small as four inches in diameter are being taken from the woods and cut in as small as 8-foot lengths. Even fire-blackened logs are rescued from complete destruction by the elements. Both logs on the ground from windthrow and fire are utilized as well as those still standing which were passed by in original logging. Eventually salvaging will follow closely the first cutting which will prevent the knocking down of second growth trees, which have already sprung up, as well as cutting loss from rot.

Of the approximately 775,000 tons of newsprint being manufactured in the United States this year, Great Northern Paper Company will produce about 300,000 tons. In 1926, 39 companies manufactured newsprint in the United States and they had a capacity of 1.7 million tons. This year only eight companies are engaged in the production of newsprint. Back in the most depressed period for the newsprint industry, the middle 1930s, the annual dividend rate of Great Northern never fell below $1. This was the period when 85 per cent of the Canadian newsprint industry went through some form of bankruptcy. earnings of Great Northern for this year appear likely to exceed $2 a share for the first time since 1941; while the increase in the price of newsprint is expected to increase earnings of the company in 1947 to their best level since the 1920s.

The index of general business activity for the week ended December 21 rose to 145.7 from 141.6 in the previous week, compared with 126.1 for the corresponding week in 1945. The index of paperboard production declined to 172.8 from 176.4 in the previous week, compared with 149.1 for the corresponding week in 1945.

Paper production for the week ended December 21 was estimated at 101.8 percent, compared with 106.7 for the preceding week, with 96.5 for the corresponding week in 1945, with 70.0 for 1944, with 72.1 for 1943, and with 63.3 percent for the corresponding week in 1942.

Paperboard production for the week ended December 21 was 102.0 percent of capacity, compared with 102.0 percent for the preceding week, with 92.0 for the corresponding week in 1945, with 88.6 for 1944, with 87.0 for 1943, and with 72.0 percent for the corresponding week in 1942.

Wood Pulp

The high level of domestic wood pulp production continues to be maintained. The rate of increase over 1945 which has accelerated slightly during the past few months gives reasonable assurance that production for the full year 1946 will approximate the 10,500,000 tons estimated earlier in the year. Whether this figure, the highest on record apart from the year 1942, is definitely reached or not, production in 1946 represents a noteworthy effort on the part of the pulp industry to supply the unusual and sustained raw material requirements of the Nation's paper and paperboard manufacturers.

Rags

Mill demand for cotton cuttings showed an expected weakening during the holidays. Dealers, meanwhile, are taking advantage of the lull to replenish their stocks. Still active are repacked No. 1 white domestic cottons at $5 per 100 pounds f.o.b. shipping point plus dealer's commission. Miscellaneous white cottons at $4.25 and old domestic miscellaneous cotton thirds and blues at $2.50.

New cotton cuttings continue active with light silesias remaining $7.50 per 100 pounds; white shirt cuttings at $10.50 to $11.00; and washables at $4.

Old Rope and Bagging

Domestic Manila and sisal continue steady at $5.75 to $6.00 for Manila and $4.50 per 100 pounds for sisal. Jute strings continue $4.50 to $5.00 f.o.b. mill New York.

Market for bagging remains steady with scrap burlap reported $4.75 to $5.00 per 100 pounds delivered to mills; No. 1 gunny $4.25 to $4.50.

Waste Paper

Paper mills are easing their demands for waste paper as they make their year-end inventory check. Dealers are building up their stocks during the slack. Prices, meanwhile, remain firm at prevailing levels. No. 1 hard white envelope cuts, one cut, continue to go at a minimum of $110.00 per ton f.o.b. New York baled; mixed books, so called, at $22 to $25; and over issue news at $35.00.

Port Alberni Plans Monument To First British Columbia Mill

VANCOUVER, B. C.—Erection of a monument to mark the establishment of the first export sawmill and the first paper mill in British Columbia may be undertaken at Port Alberni, B. C. A conference on this matter was recently held by the councils of Alberni and Port Alberni. It is suggested that the old milling stones of the original British Columbia paper mill, which are now located near the site of the old plant, could be used to form the monument. The stones were cut in Scotland and brought around Cape Horn by sailing ship.

Smith Pays Off For Suggestions

LEE, Mass.—Leo Scolforo received the highest award of the month $36.75, under the paid suggestion system of Smith Paper, Inc. His suggestion was on second felt stretch roll boxes. Thomas McGinty was awarded $12.87 for a portable industrial vacuum cleaner.

Other awards were Anthony Frulla, $10, stenciling fuse boxes; Elmer Forrest, $5, reclaiming excess valves; George Mackey, $5, improved pallet for roll transportation; Leroy Stransky, $5, forms using multiple carbons.

MISCELLANEOUS MARKETS

Office of the PAPER TRADE JOURNAL,
Tuesday, December 31, 1946.

BLANC FIXE — Active demand reported with raw materials still tight. Pulp is currently quoted at $40 per ton, in barrels, car lots, at works; the powder is currently quoted at $60 per ton, car lots, f.o.b. works.

BLEACHING POWDER — Supplies reported adequate to meet demands although there is some delay in current shipments. Quotations are unchanged. Prices on bleaching powder range from $2.50 to $3.10 per 100 pounds, in drums, car lots at works.

CASEIN — Current prices on processed acid precipitated casein are reported around 46 to 52 cents per pound for both domestic and Argentine grades; f.o.b. shipping point, with quantity not specified at the present time. Supplies are expected to increase at the year's end.

CAUSTIC SODA—Market remains critical with supplies tightest ever. Shipments are behind schedule. Cutback production further reduces stocks. Solid caustic soda is reported at $2.30 per 100 pounds; flaked and ground offered at $2.70 to $2.95 per 100 pounds. All prices car lots.

CHINA CLAY—Demand continues to increase while supplies become tighter. Quotations remain unchanged. Domestic filler clay is currently quoted at from $8.50 to $9 per ton; coating clay is quoted at from $12 to $22 per ton, at mine. Imported clay is quoted at from $22 to $25 per long ton, ship side. All prices quoted in car lots.

CHLORINE — Market tight as demand continues to exceed output, stocks low. Lack of tank cars continues to hamper deliveries. Quotations unchanged. Chlorine is currently quoted at $2 to $2.25 per 100 pounds, in single unit tank cars, f.o.b. works.

ROSIN—Gum rosin in drums, per 100 pounds net, in yard New York, car lots, B, D, E, $8.35; F, G, H, I, K, M, N, WG, $8.55; WW, $8.65. Wood Rosin, per 100 pounds, l. c. l., f.o.b. N. Y., B, $6.35; FF, $7.35; G, H, I, $8.35; WW, $8.55. Business is brisk, with more and more export licenses arriving from Washington.

SALT CAKE — Demand increasing with supplies showing little improvement. Prices remain unchanged. Domestic salt cake is quoted at $15 per ton in bulk. Chrome salt cake is quoted at $16 per ton. All prices in car lots f.o.b. shipping point.

SODA ASH — Demand active as supplies continue short, previous orders filled. Contract orders for 1947 heavy. Quotations continue unchanged. Current prices, car lots, per 100 pounds, are as follows: in bulk, $.95; in paper bags, $1.05; and in barrels, $1.35. This market is not expected to ease up before June, 1947.

STARCH—Supplies are showing steady improvement. Previous orders filled. Starch prices remain unchanged. The pearl grade is quoted at $3.62 per 100 pounds; powdered starch at $3.73 per 100 pounds; both prices in bags, car lots f.o.b. Chicago.

SULPHATE OF ALUMINA—Demand active, supply fair. Quotations continue unchanged. The commercial grades are quoted at from $1.15 to $1.20 per 100 pounds, in bags, car lots, f.o.b. works. The iron free is currently quoted at $1.75 to $2 per 100 pounds, in bags, at works.

SULPHUR—Strong seasonal demand is reported with stocks plentiful to meet all requirements. Annual contracts are quoted at $16 per long ton, f.o.b. mines; the price f.o.b. at Gulf Ports is $20 per long ton. All prices in car lots.

TALC—Domestic and French grades are moving in fair volume with prices steady. Domestic grades are currently quoted at from $16 to $30 per ton at mines; Canadian at $35 to $45 per ton. All prices in car lots.

MARKET QUOTATIONS

With the elimination of price controls on paper, pulp, rags and other materials, the quotations given below once more become indicative of trends in an open market. At the moment they can be of little more, for, while some volume of business still is being done, under contract at the figures given below, fluctuations representing special conditions are too varied and too frequent to permit prices to be given as representing a wholly stabilized market.

Paper

(Delivered New York)

Standard News, per ton—			
Roll, contract	$84.00	@	—
Sheets	103.00	"	—
Kraft—per cwt.—Carload Quantities Zone A, Delivered			
Superstandard Wrapping	*$5.75	@	$6.00
No. 1 Wrapping	*5.50	"	5.75
Standard Wrapping	*5.25	"	5.50
Standard bag	*5.25	"	5.50

* Prices for Standard Wrapping are for 40 lb. base weight; for Standard Bag for 30 lb. base weight.

Tissues—Per Ream 24x36 (480) 10 lb. Zone 1.			
Wh. No. 1 Frd.	1.10	@	1.20
Wh. No. 1 M. G.	1.10	@	1.20
Wh. No. 1½	.95	@	1.10
Wh. No. 2	1.00	@	1.10
Wh. Anti-Tar.	2.25	@	3.50
Kraft Unbl.	1.15	@	1.25
Manila No. 2	.90	@	1.05
Toilet—Per Case of 100 rolls 1 M Sheets.			
Unbleached	4.47	@	5.50
Bleached	6.50	"	—
Paper Towels — Per Case of 3750 Zone 1.			
Wh. C. fold 11x13¼	4.09	@	—
Br. Sgl. fold 10 in.	2.37	"	2.48
Br. M'tif'd 9½x14¾	3.48	"	—
Br. M'tif'd 9½x9¾	2.37	"	2.48
Manila—per cwt.—C. l. f. a.			
No. 1 Jute	11.25	@	—
No. 1 Manila 35 lb.	6.00	"	7.00
Boards, per ton—			
News	*70.00	@	75.00
Chip	*67.50	"	73.00
Sgl. Mla. Li Chip	*80.00	"	89.00
White Pat. Coated	*86.00	"	101.50
Kraft Liners 42 lb.	*84.00	"	100.00
Binders Boards	94.00	"	126.00

Base Prices per 10 tons. Less than 10 tons but over 3 tons, add $2.50; three tons or less, add $5; regular 35-39 basis, add $5; basis 40-49, add $2.50; basis 91-100, add $2.50; basis 101-120, add $5.

The following are representative of distributors' resale prices, all deliveries in Zone 1:

Rag Content Bonds and Ledgers—White, Assorted Items

	Bonds		Ledgers
100% Rag Ext. No. 1	$39.75@$46.75		$40.50@$48.00
100% Rag.	32.85 " 38.50		34.00 " 40.00
85% Rag	.... "		30.55 " 38.75
75% Rag	24.30 " 28.50		24.45 " 30.00
65% Rag	.... "		.... " ....
50% Rag	20.05 " 24.50		21.25 " 25.75
25% Rag	17.85 " 21.75		19.00 " 23.25

Colors at $1.00 cwt. extra.

Sulphite Bonds and Ledgers.. White, Assorted Items

	Bonds	Ledgers
No. 1	$12.00@$14.50	$13.15@$16.00
No. 2	11.25 " 13.75	12.25 " 15.00
No. 3	.... "	.... " ....
No. 4	10.60 " 13.00	11.75 " 14.25

Colors $1.00 cwt. extra.

Free Sheet Book Papers—White, Cased Paper

No. 1 Glossy Coated	$14.70	@ $16.75
No. 2 Glossy Coated	13.75 "	15.50
No. 3 Glossy Coated	13.20 "	16.00
No. 4 Glossy Coated	12.80 "	14.30
No. 1 Antique (Watermarked)	11.35 "	12.75
No. 2 Offset	10.65 "	12.25
A Grade E. F.	10.60 "	12.00
A Grade S. & S. C.	11.00 "	12.50
B Grade E. F.	10.30 "	11.75
B Grade S. C.	10.70 "	12.25
C Grade E. F.	10.00 "	11.50
C Grade S. C.	10.40 "	12.00
D Grade E. F.	9.70 "	11.00
D Grade S. & S. C.	10.10 "	11.50

Ivory & India at $.50 cwt. extra.

Wood Pulp

Domestic mill prices delivered with former OPA freight allowances.

	Per Short ADT		
Groundwood	$75.00	@	—
Unbleached Sulphite	100.00	"	—
Bleached Sulphite	115.00	"	—
Bleached Soda	105.00	"	110.00
Unbleached Sulphate	100.00	"	—
Unbleached Kraft	95.00	"	97.50
Southern Kraft	90.00	"	—

Canadian mill prices delivered with freight allowances of $7.50 per ADT; unless otherwise specified:

	Per Short ADT		
Regular Kraft	$95.00	@	$97.50
Select Unbleached Kraft (no freight allowance)	99.00	"	—
Unbleached Sulphite	100.00	"	—
Glassine Unbleached Sulphate (no freight allowance)	90.00	"	—
Bleached Soda	110.00	"	—
Groundwood	70.00	"	75.00
Sideruns Pulping News	74.00	"	—
Hardwood and Specialty Grades	Nominal		

Swedish wood pulp prices, per ton of 2,000 lbs. air dry weight on dock usual Atlantic and Gulf ports with an average freight cost of about $9.00 per short ton included. Subject to change as it is said these prices are not satisfactory to Swedish producers:

	Per Short ADT
Bleached Sulphite	$120.00
Bleached Kraft	126.00
Unbleached Sulphite	95.00
Unbleached Kraft	89.00
Finnish quotations f.o.b. shipping point	Per Short ADT
Bleached Sulphite	$165.00
Unbleached Sulphite	132.50
Unbleached Sulphite (special grade)	137.50
Unbleached Sulphate	132.50
Unbleached Sulphate (special grade)	159.00

Other European countries, at the present time, are not quoting on prompt and forward deliveries of wood pulp, because they have no tonnage available for export.

New Domestic Cotton Cuttings

(Prices delivered Mill Plus Dealer's Commission)

Finnish quotations f.o.b. shipping point	
White Shirt	$10.50
Light Silesias	7.50
Unbleached Muslin	11.00
White Back Blue Overalls	8.25
Blue Overalls	7.75
Unbl. Fancy Shirt	4.50
Light Percales	5.50
Light Prints	5.25
Washables	4.00
Blaechable Khaki	5.50
Unbleachable Khaki	5.00
Cottonades	4.50

Old Domestic Cotton Rags

(F.O.B. Shipping Point Plus Dealer's Commission)

	Per 100 lbs.
No. 1 Whites Repacked	$5.00
No. 1 Whites Miscellaneous	4.25
No. 2 Whites Repacked	4.00
No. 2 Whites Miscellaneous	3.50
Blue Overalls	3.75
Thirds and Blues Repacked	3.00
Thirds and Blues Miscellaneous	2.50
No. 1 Roofing Rags	1.85
No. 2 Roofing Rags	1.75
No. 3 Jute Bagging	1.65
No. 4 Brussels and hard back carpets	1.65
No. 5A Roofing Rags	1.65

New Foreign Cotton Cuttings

(Prices delivered Mill)

	Per 100 lbs.
New Dark Cuttings	$6.00 to ....
New Mixed Cuttings	6.50 " ....
Light Silesias	9.00 " 10.00
Light Flannelettes	8.00 " 9.00
New White Cuttings	13.00 " 15.00
Fancy Shirt Cuttings	9.00 " 10.00
Light Prints	8.00 " 10.00
Bleachable Khaki, No. 1	7.00 " 7.50
Unbl. Khaki, No. 1	6.25 " 6.75

Old Foreign Rags

(F.O.B. New York)

	Per 100 lbs.
No. 1 White Linens	$14.00 to 16.00
No. 2 White Linens	12.00 " 13.00
No. 3 White Linens	8.00 " 9.00
No. 4 White Linens	8.00 " 9.00
No. 1 White Cottons	10.00 " 12.00
No. 2 White Cottons	8.00 " 9.00
No. 3 White Cottons	6.50 " 7.00
No. 4 White Cottons	5.00 " 5.50
Extra Light Prints	7.50 " 8.00
No. 1 New Light Prints	6.25 " 6.75
Med. Light Prints	5.25 " 5.75
Dutch Blue Cottons	5.25 " 5.50
Checks and Blues	4.00 " 4.25
Linsey Garments	4.50 " 5.00
Dark Cottons	3.75 " 4.00
Old Shopperies	3.25 " 3.50
New Shopperies	3.25 " 3.50

BAGGING

(Prices to Mill, f.o.b. N. Y.)

	Per 100 lbs.
Foreign Gunny, No. 1	$4.75 to 5.00
Domestic Gunny, No. 1	4.25 " 4.50
Light Wool Tares	4.50 " 4.75
Heavy Wool Tares	4.75 " 5.00
Bright Bagging	4.25 " 4.50
Foreign Manila Rope	6.00 " 7.00
Domestic Manila Rope	5.75 " ....
Jute Strings	4.50 " 5.00
No. 1 Sisal Strings	4.00 " 4.50
Mixed Strings	1.75 " ....

Waste Paper

Prices to Mills

(Dollars Per Ton)

F.o.b. New York, Baled

No. 1 Hard White Envelope Cuts, one cut	$100.00 @ $110.00
No. 1 Hard White Envelope Cuts	85.00 " 100.00
No. 1 Hard White Shavings, unruled	100.00 " —
No. 1 Hard White Shavings, ruled	80.00 " 90.00
Soft White Shavings, one cut	85.00 " 90.00
No. 1 Soft White Shavings	75.00 " 80.00
Soft White Shavings, Misc.	65.00 " —
No. 1 Fly Leaf Shavings	40.00 " —
No. 1 Fly Leaf Shavings	(nominal)
No. 1 Groundwood Fly Leaf Shavings	30.00 " 33.00
No. 2 Mixed Groundwood Fly Leaf Shavings	(nominal)
Mixed Colored Shavings	(nominal)
Mixed Groundwood Colored Shavings	(nominal)
Overissue Magazines	(nominal)
No. 1 Heavy Books & Magazines	38.50 " —
Mixed Books	22.00 " 25.00
No. 1 White Ledger	50.00 " 52.00
No. 2 Mixed Ledger, colored	40.00 " 45.00
New Manila Envelope Cuttings, one cut	65.00 " 75.00
New Manila Envelope Cuttings	65.00 " 75.00
Extra Manilas	(nominal)
Mixed Kraft, Env. & Bag Cuttings	70.00 " —
Kraft Envelope Cuttings	80.00 " 85.00
Triple Sorted, No. 1 Brown Soft Kraft	55.00 " —
New 100% Kraft Corrugated Cuttings	55.00 " 60.00
No. 1 Assorted Old Kraft	40.00 " —
New Jute Corrugated Cuttings	27.00 " —
Old 100% Kraft Corrugated Containers	(nominal)
Box Board Cuttings	23.00 " —
White Blank News	45.00 " —
Overissue News	35.00 " —
No. 1 News	25.00 " 26.00
No. 1 Mixed Paper	19.00 " 21.00
Old Corrugated	28.00 " 30.00
Mill Wrappers	22.00 " 25.00

Twines

All Prices Nominal

(F. o. b. Mill)

(Soft Fiber)

Coarse Polished—	
India	.26 @ —
White Hemp	.26 " —
Fine Polished—	
Fine India	.31 " —
Unpolished—	
Box	.20¾ " —
Paper Makers	.20 " —
Tube Rope	.22 " —
Wall Paper	.23½ " —
Wrapping	.26 " —
Soft Fiber Rope	.22 " —
Cotton	.28 " —

(Hard Fiber)

Medium Java	.23 " —
Mex. Sisal	.21 " —
Manila	.33 " —

PHILADELPHIA

Domestic Rags (New)

(F.O.B. Eastern Shipping Point)

Shirt Cuttings—	
New White No. 1	.07¼
New White No. 2	.05¾
Light Silesias	.05¾
Black Silesias, soft	.03¾
New Unbleached	.07½
Washable Prints	.04¼
Washable No. 1	.03
Blue Overall	.05½
Cottons—Acording to grades—	
Washable Shredding	.01¼
Fancy Percales	.04¼
New Black Soft	.03¼
Khaki Cuttings—	
Unbleachable Cotton Cuttings	.03½
Bleachable Cotton Cuttings	.04½
Men's Corduroy	.03½
Ladies' Corduroy	.03
Cottonades	.03¼

Domestic Rags (Old

White No. 1—Repacked	3.80 to 4.00
Mixed White	3.50 " —
White No. 2—Repacked	2.90 " —
Thirds and Blues—	
Miscellaneous	1.80 " 2.50
Repacked	2.20 " —
Roofing Stock—	
Foreign No. 1	1.85 " —
Domestic No. 1	1.75 " —
Domestic No. 2	1.65 " —
Roofing Bagging	1.35 " —
Old Manila Rope	5.75 " —

Bagging

(F.O.B. Eastern Shipping Point)

Gunny No. 1—	
Foreign	Nominal
Domestic	3.00 to 3.50
No. 1 Clean Bright—	
Sisal Strings	.04 " —
No. 2 Clean Bright—	
Sisal Strings	.03 " —
Sisal Jute	.02½ " .02¾
Scrap—	
No. 1	3.25 " 3.50
No. 2	1.75 " 1.85
Wool Tares, heavy	4.00 " 4.25
No. 1 New Light Burlap	3.90 " 4.00
New Burlap Cuttings	3.75 " 4.00

Old Papers

(F. o. b Phila.)

Mill Prices, Baled

No. 1 Hard White Envelope Cuts, one cut	$100.00 @ $115.00
No. 1 Hard White Shavings, unruled	100.00 " —
Soft White Shavings, one cut	90.00 " 95.00
White Blank News	45.00 " 50.00
Soft White Shavings, Misc.	65.00 " 70.00
No. 1 White Ledger	52.00 " 55.00
No. 2 Ledger, colored	42.00 " 45.00
No. 1 Heavy Books & Magazines	38.50 " 40.00
Overissue Magazines	nominal
New Manila Envelope Cuttings	65.00 " 75.00
No. 1 Assorted Old Kraft	40.00 " —
No. 1 Mixed Paper	19.00 " 21.00
Box Board Cuttings	23.00 " 25.00
Kraft Corrugated Cuttings	nominal
Old Corrugated	28.00 " 30.00
Overissue News	35.00 " —
No. 1 News	26.00 " 30.00

BOSTON

Old Papers

(F. o. b. Boston)

Mill Prices, Baled

No. 1 Hard White Shavings, unruled	5.00 @ 6.00
No. 1 Hard White Shavings, ruled	5.00 " 6.00
Soft White Shavings, Mis.	5.00 " 6.00
No. 1 Fly Leaf Shavings	1.67½ " —
No. 2 Fly Leaf Shavings	2.00 " —
No. 1 Groundwood Fly Leaf Shavings	1.25 " —
No. 2 Groundwood Fly Leaf Shavings	.90 " —
Mixed Colored Shavings	.75 " —
New Manila Envelope Cuts, one cut	2.87½ " —
Hard White Envelope Cuts, one cut	3.37½ " —
Triple Sorted No. 1 Brown Soft Kraft	2.50 " —
Mixed Kraft Env. & Bag Cuttings	2.75 " —
Kraft Envelope Cuttings	3.75 " —
No. 1 Heavy Books & Magazines	1.92½ " —
New Manila Envelope Cuts, one cut	2.87½ " —
New Manila Envelope Cuttings	2.65 " —
White and Colored Tabulating Cards	3.25 " —
Groundwood Tabulating Cards	1.35 " —
White Blank News	1.65 " —
No. 1 Assorted Old Kraft	— " 3.00
No. 1 Mixed Paper	— " .95
Overissue News	— " 1.25
Box Board Cuttings	.72½ " —
New Corrugated Cuttings, Kraft	2.25 " —
Old 100% Kraft Corrugated Containers	1.75 " —
Old Corrugated Containers	— " 1.40
Jute Corrugated Cuttings	1.07½ " —

Bagging

(F. o. b. Boston)

Gunny Bagging—	
Foreign	5.00 @ —
Domestic	5.25 " —
Sisal Rope No. 1	6.00 " —
Sisal Rope No. 2	5.50 " —
Mixed Rope	5.25 " —
Transmission Rope—	
Foreign	(nominal)
Domestic	3.50 " —
Manila Rope—	
Foreign	(nominal)
Domestic	5.75 " —
Soft Jute Rope	4.50 " 5.00
Jute Carpet Threads	6.00 " —
Bleachery Burlap	8.50 " 9.00
Scrap Burlap—	
Foreign	(nominal)
Domestic	3.00 " 3.25
South America	— " 3.25
Wool Tares—	
Foreign	4.50 " —
Domestic	4.50 " —
Aust. Wool Pouches	5.00 " 5.25
New Zealand Wool Pouches	5.25 " 5.50
New Burlap Cuttings	5.50 " 6.00
Heavy Baling Bagging	5.25 " 5.75
Paper Mill Bagging	3.50 " 3.75
No. 1 Roofing Bagging	1.75 " —

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—	
New Light Prints	.06 @ .06½
Fancy Percales	.04¼ " .05
New White No. 1	.06¾ " .07
New Light Flannelettes	.09½ " .10
Canton Flannels, Bleached	.06 " .06¾
Underwear Cutters, Bleached	.06¼ " .06¾
Underwear Cutters, Unbleached	.05¾ " .06
Silesias No. 1	.06 " .06¾
New Black Silesias	.03 " .03¾
Red Cotton Cuttings	.03½ " .04
Soft Unbleached	.11½ " .12
Blue Cheviots	.05½ " .04
Fancy	.02¾ " —
Washable	.02¾ " —
Khaki Cuttings	.02¾ " .03
O. D. Khaki	.06 " .06¾
Corduroy	.03¼ " .03½
New Canvas	.06¼ " .06½
B. V. D. Cuttings	.11½ " .12

Domestic Rage (Old)

(F. o. b. Boston)

White No. 1—	
Repacked	3.80 @ —
Miscellaneous	3.20 " —
White No. 2—	
Miscellaneous	2.65 " —
Twos and Blues, Repacked	2.20 " —
Old Blue Overalls	2.25 " 2.50
Thirds and Blues, Repacked	2.20 " —
Miscellaneous	1.80 " —
Black Stockings	3.50 " 4.00
Roofing Stock—	
No. 1	2.00 " —
No. 2	1.90 " 2.00
No. 3	1.35 " —
No. 4	1.35 " —
No. 5, Quality A.	1.35 " —
Quality B.	1.20 " —
Quality C.	.95 " —
Old Manila Rope	6.00 " —

Foreign Rags

(F. o. b. Boston)

Canvas	(nominal)
Dark Cottons	(nominal)
Dutch Blues	(nominal)
New Checks and Blues	(nominal)
Old Fustians	(nominal)
Old Linsey Garments	(nominal)
New Silesias	(nominal)

CHICAGO

Waste Paper

(F. o. b. Chicago)

Mill Prices, Baled

Shavings—	
No. 1 Hard White Envelope Cuts, one cut	$110.00 @ $120.00
No. 1 Hard White Shavings, unruled	105.00 " 115.00
No. 1 Soft White Shavings	80.00 " 95.00
No. 1 White Ledger	55.00 " 65.00
No. 1 Heavy Books & Magazines	40.00 " 43.00
White Blank News	43.00 " 49.00
Mixed Kraft Env. & Bag Cuttings	75.00 " 85.00
No. 1 Assorted Old Kraft	45.00 " 55.00
Overissue News	38.00 " 42.00
No. 1 News	30.00 " —
No. 1 Mixed Paper	19.00 " —
Old Corrugated	32.00 " 35.00
Mill Wrappers	25.00 " 29.00

PAPER TRADE JOURNAL

Title Reg. U. S. Pat. Off.

W. L. Cook, Editor

Henry J. Berger

HENRY J. BERGER returned to his old home in Webster, Massachusetts, on Friday of last week to enter into his last rest. For his final journey he was accompanied only by members of his family, and farewells were said by members of that closely knit circle of friends which he had drawn around him as a group apart from the wider field in which he had been active and prominent for so many years. His passing had followed in the early hours of Christmas morning upon a seizure of faintness which had come upon him on the day before at his home in Beacon, New York, where he had lived with his brother and the latter's family, following his retirement eighteen months ago. Funeral services were held on Saturday morning.

It was typical of Henry Berger, and of the school that he represented, that his passing should be mourned by separate groups. The group of friends which he had drawn about him over years of association, knew him as a man of warm sympathy, of a kindly generous disposition, a judge of human nature whose rules were based on the Ten Commandments. He had never married; his family attachments were directed to his brother and the brother's home and family. He was accustomed to seek relief from the city's crowds and the pressure of his work, from the hotel in which he lived for nearly two decades, by frequent visits to his brother's home in Beacon, and when he laid aside his duties he sought the peaceful quiet of the Hudson Valley in that town. The restful life there had appeared to benefit him, and only a few weeks before his passing he had visited New York and his old office, greatly improved in his health to all outward signs.

In his work he was steadfast, completely loyal to his job and to the industry which that job represented. He had become editor of the PAPER TRADE JOURNAL in June, 1916, after an earlier connection with the company that then published it. Born April 16, 1874, he had graduated from Dartmouth in 1899, as a Bachelor of Literature. He had gone to Boston and worked there for the American Architect. Coming to New York he had joined the staff of the old New York Commercial; then he had gone to the Textile World, under J. H. Bragdon. From there he had gone to the American Stationer, and from that time onward paper was always uppermost in his mind. He left that connection for a time to be editor of Geyer's Stationer. Later he returned to this organization to be editor of the American Stationer, and in 1916 he assumed the editorship of PAPER TRADE JOURNAL, and of Lockwood's Directory which he was to hold continuously for 29 years.

During those years he was to see developments of the greatest magnitude in pulp and paper. As a trained observer and interpreter he was to sit close to the scene where new processes were developing, where new kinds and qualities of paper were to be turned out for the service of mankind, and where new uses were to be served by the product of the forests. When he retired he still bore the conviction that still greater things lie ahead for the men in the pulp and paper industries.

Sound Sense

Though its more immediate appeal may lie in quite other directions than are associated with stocks on hand and deliveries, a general industrial movement of the past few months cannot do other than stimulate confidence in management from all whose future profits rely on sound policies. That is the general movement among major Canadian paper mill companies to strengthen their financial positions now that opportunity has been afforded them to do so.

Perhaps more than in any other type of industry, these pulp and paper companies have made good use of the attractive conditions of the 1946 capital markets. With few exceptions, most companies redeemed their outstanding bonds, partly or in full, or refunded them on more favorable interest bases. Dollar parity enabled them to replace their two- or three-way pay bonds by bonds payable in Canadian funds only.

The Canadian investor and the American customer have seen these companies cut funded debt this year from $227 millions at the end of 1945, to $175 millions, a reduction of 23 per cent. They have seen fixed charges reduced even more: from $11 millions in 1945 to an indicated $7 millions on an annual basis at the present time, or nearly 40 per cent. They have also seen the cost of carrying outstanding pulp and paper funded debt reduced from 4.82 per cent to 3.95 per cent.

To holders of junior securities, this large-scale capital structure revamping program has meant increased per share earning power. Several companies

Calendar of Coming Events

January 29-31, 1947 — Canadian Pulp and Paper Association, Annual Meeting, The Mount Royal, Montreal, P. Q.

January 29, 1947—Southern Pulpwood Conservation Association, Annual Meeting, The Ansley Hotel, Atlanta, Ga.

February 23-27, 1947—The American Paper and Pulp Association, Annual Meeting, The Waldorf-Astoria, New York City.

February 24-27, 1947—Technical Association of the Pulp and Paper Industry, Annual Meeting, The Commodore, New York City.

May 22-24, 1947—American Pulp and Paper Mill Superintendents Association, Annual Convention, Edgewater Beach Hotel, Chicago.

have also strengthened the earning position of the common shareholders by refunding their preferred issues as well.

To a basic industry that relies on the skill and judgment of the heads of these companies for assured future soundness of method and policy the spectacle presented by the record is even more heartening.

Index

Times may have been considerably simpler when the family physician based his diagnosis on a single pulse and a fever thermometer. It is doubtful however, that any doctor would want to reply simply on those two indices now; the state of the medical profession has advanced too far to let it curb its judgments within the limits set by those two factors.

That thought is offered particularly to those in Canada who would profess to be able to foresee next week's demand for paper by any single factor of this week's experience. Notable among the omens that are only partly to be considered in any judgment of the market is the volume of advertising placed in newspapers.

Indications that consumption of newsprint may fall off in the immediate future are sought in the trend of newspaper circulation and newspaper advertising linage, particularly the latter. And advertising linage in recent months, still well above any level since November, 1929, has shown a tendency to level off.

Most people agree that it is yet too early to read into this the inference that the handwriting for newsprint consumption is on the wall. However, they are watching returns during the balance of the fourth quarter which may tell the story for newsprint consumption and production.

Production Ratio Report*

(Production as per cent of six-day capacity)

COMPARATIVE WEEKLY SUMMARIES

Current Weeks—1946		Corresponding Weeks—1945	
November 9	106.8	November 10	97.0
November 16	104.9	November 17	96.4
November 23	106.6	November 24	91.4
November 30	103.0	December 1	97.5
December 7	106.6	December 8	99.0
December 14	106.7	December 15	99.0
December 21	*101.8*	December 22	96.5

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Year Avg.
1945	86.7	89.4	90.2	88.1	89.8	91.2	80.8	88.6	90.2	95.9	95.9	91.0	89.7
1946	94.7	98.4	104.4	102.7	100.7	104.6	94.0	104.7	101.3	106.4	*105.5*		

COMPARATIVE YEARLY SUMMARIES

	1939	1940	1941	1942	1943	1944	1945	1946
Year to Date	83.5	86.1	97.3	90.7	88.1	88.6	89.9	*101.6*
Year Average	83.4	85.6	97.4	90.4	87.8	88.1	89.7	

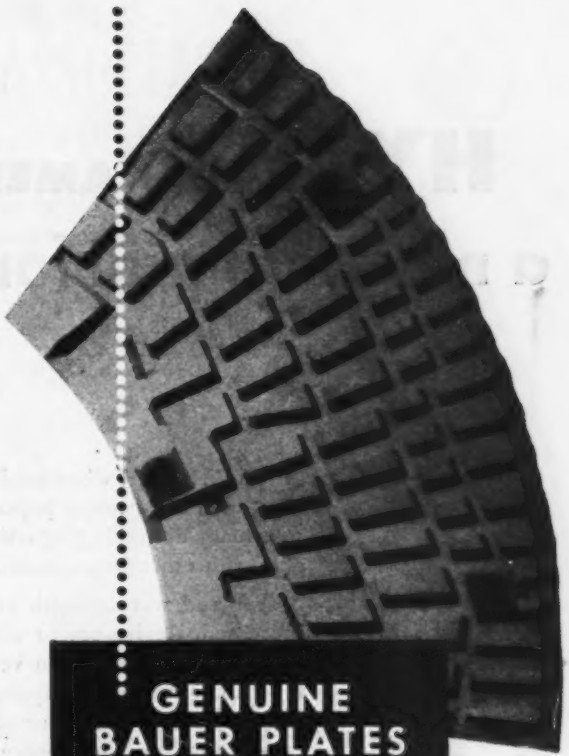
PAPERBOARD OPERATING RATIOS†

Current Weeks—1946		Corresponding Weeks—1945	
November 9	102	November 10	97
November 16	101	November 17	95
November 23	100	November 24	91
November 30	94	December 1	96
December 7	99	December 8	97
December 14	102	December 15	98
December 21	102	December 22	92

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Year Avg.
1945	91	95	97	97	96	96	86	90	91	97	95	85	93
1946	90	97	100	99	94	97	89	99	96	100	99		

* Based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

† Per cents of operation based on "Inch-Hours" reported to the National Paperboard Association.



GENUINE BAUER PLATES FOR BAUER PULPERS

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Made of patented abrasion-resisting alloy. Skillfully cast and ground and also precisely balanced.

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Bauer

THE BAUER BROS. CO.
SPRINGFIELD, OHIO

HYCAR AMERICAN RUBBER LATEX...
a new material for paper impregnation

HYCAR latex, when used as an impregnant for even inexpensive papers, imparts to the papers many desirable properties not readily obtainable with other impregnants.

Tear and wet strength are very considerably increased. Resistance to oils, chemicals, aging, and flexing are added in very desirable degrees. HYCAR-impregnated papers may then be coated with any one of a number of coating materials to impart additional properties.

Potential applications for papers of this sort range from gaskets to leather replacement materials, shelf paper to floor coverings, wallpaper to insoles.

HYCAR latex is very easy to use. No vulcanization is required. Normal drying times are used. And in latex form HYCAR is an inherently safe material to handle. No solvent system is needed even when HYCAR latex is used as a coating material.

We would be glad to work with you on any problems relating to the use of HYCAR latex. For more information, please write Department HJ-1, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio.

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American Rubber

B. F. Goodrich Chemical Company
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Section of the
TECHNICAL ASSOCIATION
OF THE PULP & PAPER INDUSTRY
122 E. 42nd St., New York 17, N. Y.
Edited by R. G. Macdonald, Secretary

Cupriethylenediamine Disperse Viscosity of Pulp*

TAPPI Suggested Method T 230 sm-46

This method describes precise and rapid procedures for determining the viscosity of cellulose solutions, using cupriethylenediamine as a solvent. (The solution is actually cupriethylenediamine saturated with $Cu(OH)_2$ but for convenience may be referred to as $Cu(En)_2$). Suitable modifications of the method permit viscosity measurements on unbleached and bleached wood pulps, and on cellulose preparations in general over the entire range of viscosity values. Two techniques are described for measuring the viscosity of the cellulose solution: (I) the viscosity-pipet method and (II) the falling-ball method. Since the two methods do not give identical results, conversion tables are appended. The additional information at the end of the method should be consulted before starting a test.

The cuprammonium method for disperse viscosity of pulp, T 206 m, has been considered standard procedure since about 1928. The new $Cu(En)_2$ method is proposed because it is more rapid and more convenient, as the $Cu(En)_2$ solvent is much more stable than the cuprammonium solvent. Pulp may be dispersed in the $Cu(En)_2$ solvent during contact with the atmosphere and the entire determination can be made in 30 to 45 minutes, whereas in the cuprammonium method it requires 15 hours merely to disperse the pulp.

Apparatus

1. *Cylinder of Nitrogen Gas,* fitted with a reducing valve to give 2 to 3 pounds pressure.
2. *Bottles* for preparation and storage of cupriethylenediamine solution (described under procedure).
3. *Viscometers* of either the pipet or falling-ball type (described under procedure).
4. *Stopwatch* which can be read to 0.1 second.
5. *Constant-Temperature Bath* capable of being maintained at 25 ± 0.1°C.

Reagents

A. *Sodium Hydroxide Solution,* 20%. Dissolve 200 grams of C.P. NaOH in 800 ml. of distilled water.

B. *Ethylenediamine,* 70%, technical grade.

C. *Standard-Viscosity Oils.* Obtainable from National Bureau of Standards, Washington, D. C.

D. *Cupriethylenediamine Solution.* This solution may be obtained already prepared, 1.0 *M* in copper, and 2.0 *M* in ethylenediamine.* Directions for preparation are as follows:

Dissolve 250 grams of C.P. copper sulphate ($CuSO_4 \cdot 5H_2O$) in approximately 2 liters of hot distilled water. Heat to boiling and add conc. NH_4OH slowly with vigorous agitation until the solution is faintly alkaline to litmus paper. (About 115 ml. of NH_4OH are required.) Let the precipitate settle, and wash by decantation with 1-liter portions of distilled water, four times with hot water and twice with cold. Then add sufficient cold water to make the volume of the slurry 1.5 liters; cool below 20°C. (preferably below 10°C.), and add slowly 850 ml. of cold 20% NaOH solution with vigorous stirring. Wash the precipitated $Cu(OH)_2$ with distilled water by decantation until the washings are colorless to phenolphthalein indicator and give no precipitation of sulphate upon addition of $BaCl_2$ solution.

Transfer the washed $Cu(OH)_2$ slurry, using sufficient water to make a total volume of 500 ml., to a 1-liter tooled-neck bottle (*see* Fig. 1) equipped with a rubber stopper carrying two glass tubes, one of which *(A)* is straight and extends to within approximately 5 cm. of the bottom of the bottle and the other has two right-angle-bends *(B* and *C)* and extends just through the rubber stopper. One of the side tubes *(B* or *C)* may be conected to a suction source and the other to the nitrogen supply.

Wire down the rubber stopper, exhaust the air with a laboratory water pump and refill the bottle with nitrogen at 2 pounds pressure three separate times. The rubber tubes and pinch clamps attached to the glass tubes of the solution bottle, as shown in Fig. 1 are used for this purpose. Draw a partial vacuum on the bottle and add 160 ml. of 70% ethylenediamine, taking care that no air enters the bottle. This is accomplished by inserting a funnel in the rubber tube attached to the longer glass tube of the solution bottle and opening the pinch clamp just enough to allow the ethylenediamine to be drawn into the bottle. Since considerable heat is evolved at this point, it is desirable to keep cold water running over the bottle during the initial phase of the reaction. After the addition of the ethylenediamine, the gas over the liquid should be alternately evacuated and flushed three times with nitrogen and 2 pounds pressure.

With the pinchcocks closed, place the bottle and

* This method is suggested by the Chemical Methods Committee as being the most suitable to date. It is not, however, a TAPPI Standard. Criticisms are earnestly requested and should be sent to R. G. Macdonald, Secretary, Technical Association of the Pulp and Paper Industry, 122 E. 42nd St. New York 17, N. Y. Reprints of this method may be obtained from the Secretary at 25 cents each.

* Obtainable in 1-gallon lots from the Ecusta Paper Corporation, Pisgah Forest, North Carolina.

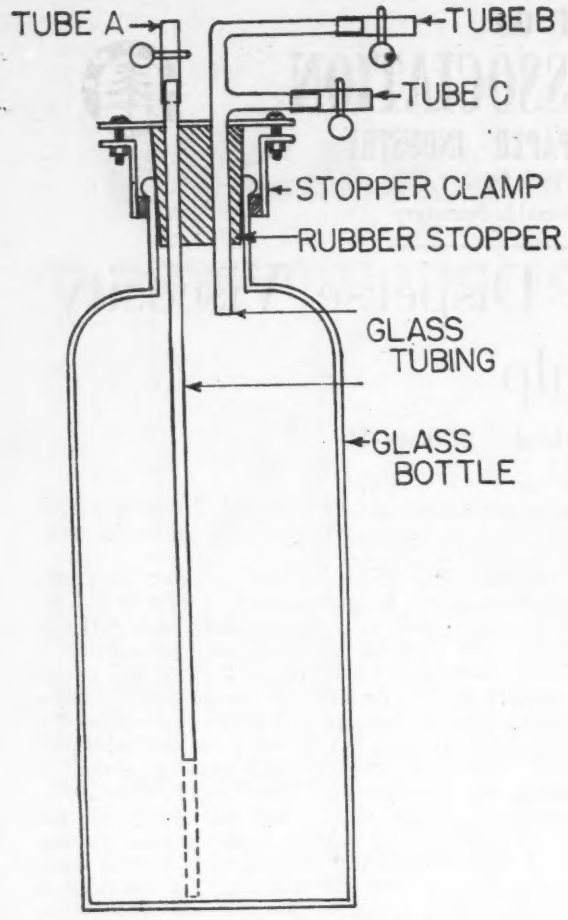

FIG. 1
Solution or Stock Bottle for Cu $(En)_2$ Viscosity Solvent

contents on a rotary shaker travelling from 5 to 10 r.p.m. and rotate for 12 to 16 hours. Then remove the bottle and allow to stand for at least 8 hours to thoroughly settle the excess $Cu(OH)_2$ sludge.

If a rotary shaker is not available, shake the contents of the bottle several times during the course of an hour, and then stand 12 to 16 hours. A clear supernatant liquor will usually be obtained, but if desired, the solution may be filtered through a Type C Corning fritted-glass Büchner funnel, using suction, and again stored under nitrogen.

STANDARDIZATION OF $Cu(En)_2$ SOLUTION

a. *Copper.* Remove a 25-ml. sample of the clear liquor by means of a pipet and dilute to 250 ml. in a volumetric flask. Pipet out a 25-ml. aliquot, add approximately 3 grams of KI, acidify with 50 ml. of 4 *N* H_2SO_4, and titrate with 0.1 *N* thiosulphate solution to the starch endpoint. Add 10 ml. of 20% NH_4CNS solution just before the endpoint is reached, to intensify it. Multiply the milliliters of thiosulphate required by 0.04 to obtain the molarity of the original solution in copper.

b. *Ethylenediamine.* Take another 25-ml. aliquot of the diluted solution, add about 75 ml. of distilled water and 2 drops of methyl orange indicator, and titrate with standard 1.0 *N* acid solution to a faint pink coloration. The color change of the solution during the titration passes from dark blue to light blue to slate grey, and finally develops a pink tinge. Multiply the milliliters of 1.0 *N* acid required by 0.4 to obtain the alkalinity in hydrogen ion equivalents.

c. *Calculation of ratio of ethylenediamine to copper.*

Let A = molarity of copper,
B = alkalinity in hydrogen ion equivalents,
and R = ratio of ethylenediamine to copper.

$$\text{Then } R = \frac{B - 2A}{2A}$$

d. *Dilution.* If the solvent is properly prepared by careful compliance with the directions given above, the molar ratio of ethylenediamine to Cu will be between 1.85 : 1 and 2.00 : 1. If the ratio exceeds 2.00 : 1, add fresh $Cu(OH)_2$ and repeat the agitation and standardization of the solution as given above.

Having obtained the proper molar ratio of ethylenediamine to Cu, force the proper amount of the original supernatant solution by nitrogen pressure into stock bottles (Fig. 1) and add sufficient distilled water to give the desired Cu concentrations as required by the respective procedures below. The Cu concentration should be checked by a further analysis, as above. The final concentrations of Cu should be within 0.5% of the prescribed value. The stock bottles shown in Fig. 1. differ from the original solution bottle by having the long glass tube extend nearly to the bottom of the bottle. When the solutions have been checked for accuracy, the stock bottles should be evacuated and flushed with nitrogen three separate times and the solution stored under nitrogen at 2 pounds pressure.

Note: The solutions should be stable for several months if stored under nitrogen. There is usually evidence of a small deposit of cuprous oxide after the solutions have been stored for varying periods of time. Usually this has a negligible influence on the copper content and the solutions need not be discarded if the copper analysis checks within the required limits.

Test Specimen

Reduce a representative sample of the pulp to the air-dry condition. Slush pulp samples shall be formed into thin sheets on a Büchner funnel or sheet mold and the sheets air dried. Hard, dry pulp specimens shall be slurried in water by shaking or with a motor-driven stirrer and made into sheets. The air-dry specimen shall be torn apart by hand into small pieces or shredded by means of a coarse file. The use of a mechanical shredder is not recommended because the viscosity is likely to be lowered in the process of disintegration.

I. Procedure by the Viscosity Pipet Method

APPARATUS

1. *Viscosity Pipets.* The Fenske-Ostwald Viscosity pipet according to A.S.T.M. Standard D 445 is used. Pipets of the following characteristics are available:

Size Number	Approx. range of efflux times, *seconds*	Viscosity range, *centipoises*
50	300-1500	0.8- 3
100	200- 700	3 - 10
200	100- 700	10 - 70
300	100- 700	25 - 125
400	100- 700	120 - 850
500	100- 700	800 -5600

Calibration. Standard-viscosity oil obtained from the National Bureau of Standards in the desired viscosity range is used for calibration.* When these pipets are calibrated with the standard oil and used in the recommended viscosity range, there is no appreciable kinetic energy correction necessary, and other viscometer errors such as loading, drainage, surface tension, etc., are negligible.

* Calibrated viscosity pipets can be purchased from laboratory supply houses if desired.

The pipet constant C is calculated from the formula:

$$C = \frac{V}{td};$$

where V = viscosity in centipoises,
d = density of the solution,
t = time in seconds for meniscus to pass between the two etched lines around capillary,
and C = pipet constant.

The constant C is determined with the use of standard-viscosity oil of known viscosity and density at 25°C. in the recommended range as follows:

Load the viscometer in an inverted vertical position with the capillary side submerged in the standard oil. Then apply suction to the other arm of the instrument and fill both small bulbs on the capillary arm with the oil. Bring the liquid into the working capillary to the etched mark. After filling the pipet, rotate it to its normal vertical position and place in a constant-temperature water bath held at 25 ± 0.1°C. The liquid will drain into the lower reservoir during the time required for it to attain the bath temperature. When this temperature is reached (in approximately 5 minutes), determine the efflux time by drawing the liquid above the mark between the two bulbs and measuring the time required for the meniscus to pass from the mark between the two bulbs to the mark below the lower bulb. Run at least two determinations. The pipet constant is obtained by dividing the known viscosity of the oil by the product of its density and efflux time.

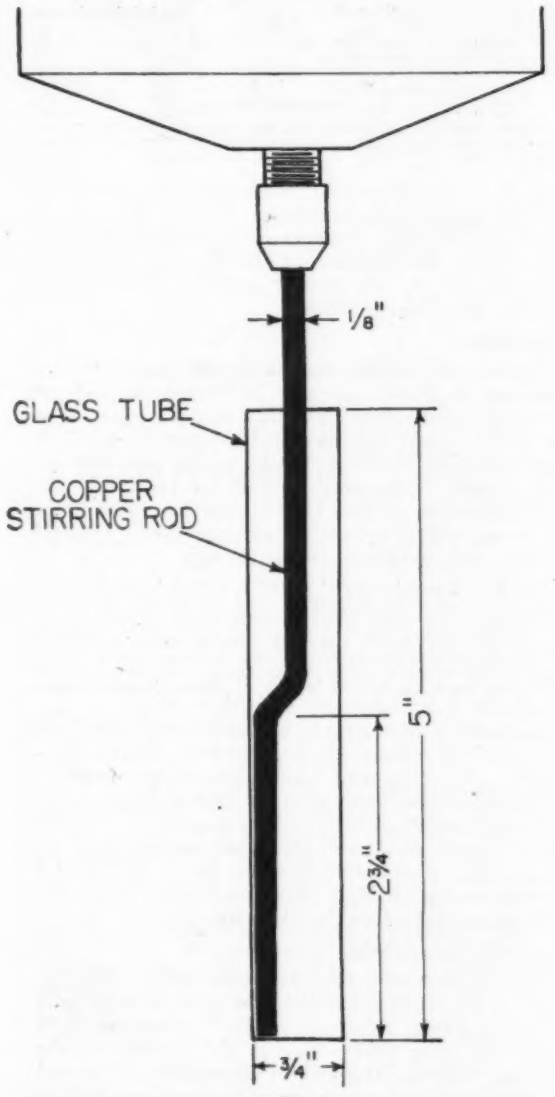

FIG. 2
Dissolving Tube

2. *Dissolving Tube.* The glass dissolving tube used for dissolving the pulp samples is shown in Fig. 2. The stirrer consists of an electrolytic-copper rod approximately ⅛ inch in diameter, bent as shown in Fig. 2. The dissolving tubes may be purchased from suppliers of scientific apparatus. Those made by the Scientific Glass Apparatus Company, Bloomfield, New Jersey, have been found satisfactory. The copper rod is conveniently made from No. 7 or No. 8 B. & S. gage copper wire after removing any insulation.

CUPRIETHYLENEDIAMINE SOLUTION

A solution 0.5 M in copper is required.

PROCEDURE

Weigh out an amount of airdry pulp equivalent to 0.125 gram of moisture-free pulp and place in the dissolving tube. (This is calculated by determining the moisture on a separate portion.) Then add 25 ml. of $Cu(En)_2$ (0.500 M in copper) and stir the solution for 15 minutes in the dissolving tube, with the stirrer rotating at approximately 400 r.p.m. Remove the stirrer and draw a portion of the solution into the viscosity pipet in the same way as given under calibration of the viscosity pipet. Determine the efflux time at 25 ± 0.1°C. Run at least two determinations, which should check within ± 0.2 second.

Note: The tubes may be cleaned with water drawn through them by means of suction. Both the pipet and dissolving tubes should be clean and dry before they are used.

REPORT

The viscosity, V, of the 0.5% pulp solution shall be calculated from the formula:

$$V = Ctd,$$

in which C is the pipet constant found; t is the time in seconds; and d is the density of the pulp solution, which is 1.052. The result shall be reported in centipoises as the cupriethylenediamine viscosity by the pipet method.

II. Procedure by the Falling-Ball Method

APPARATUS

1. *Aluminum Alloy Balls* 1/16 inch in diameter (0.0625 ± 0.0005 inch) with a sphericity of 0.0001 and made of 17-ST aluminum alloy. Those made by the Hartford Steel Ball Co., Hartford, Conn., have been found satisfactory.

2. *Dissolving Bottles.* Two-ounce flat medicine bottles with a plastic screw cap and rubber gasket.

3. *Viscosity Tubes.* Glass tubes 30 cm. long with an inside diameter of 1 ± 0.005 cm., open at the ends. They may be obtained from laboratory supply houses. They should be etched with rings exactly 15 cm. apart, the rings to be approximately equidistant from the ends of the tube.

4. *Standard Oil.* The oil used for standardization is standard-viscosity oil "M" obtained from the National Bureau of Standards, and furnished with a statement of the exact viscosity. It will have an absolute viscosity of about 200 cp. at 25°C.

CALIBRATION

To calibrate a viscosity tube, fill it with the standard oil, place it in a tube holder, and immerse in a constant-temperature bath at 25 ± 0.1°C. for at

least 1 hour. The tube holder may be any convenient type of clamp which will hold the tube in a vertical position. The adjustment of the clamp may be checked by means of a small plumb line. Carefully drop a $\frac{1}{16}$ inch aluminum ball in the center of the tube (this is easily accomplished with a little practice), and determine the time of fall between the two etched rings to the nearest 0.1 second. Repeat until checks within 0.1 second are obtained.

Calculate the tube constant, K, from the following equation:

$$K = \frac{V}{t\,(D - d)}; \qquad (1)$$

where V = viscosity of standard oil at 25.0° C.,
K = tube and ball constant,
t = time of fall through standard oil as determined in previous paragraph,
D = density of aluminum balls,
and d = density of standard oil at 25.0° C.

In determining the viscosity of an unknown $Cu(En)_2$ cellulose solution, however, the equation is:

$$V' = Kt'\,(D - d') \qquad (2)$$

where V' = viscosity of unknown solution,
t' = time of fall of aluminum ball through unknown solution,
and d' = density of $Cu(En)_2$ cellulose solution at 25.0° C. = 1.052.

Then, from equation (1):

$$V' = \frac{V\,(D - 1.052)}{t\,(D - d)}\,t' = Ct', \qquad (3)$$

where $\frac{V\,(D - 1.052)}{t\,(D - d)} = C$, *the tube constant* for solutions of cellulose in $Cu(En)_2$.

Cupriethylenediamine Solutions

Two solutions are required: one $0.167 \pm 0.003\ M$ in copper, the other $1.0 \pm 0.005\ M$ in copper.

Dissolving the Sample

When certain types of cellulose, especially those with a high viscosity, are dispersed in 0.5 M $Cu(En)_2$, there is a tendency toward surface gelatinization of the sample, leading to incomplete dispersion. To overcome this, it has been found desirable to wet the cellulose sample with the proper amount of weaker (0.167 M) solution. The correct amount of the stronger (1.0 M) solution is then added to bring the solvent to 0.5 copper molarity.

To determine the amount of each solution to be added, the following equations are used:

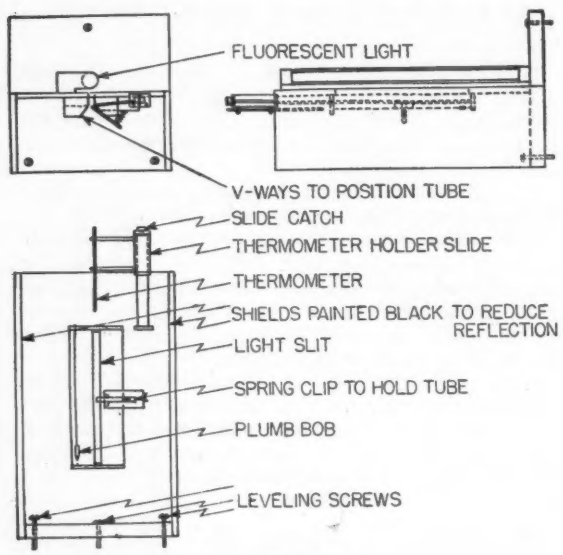

Fig. 3
Tube Holder

$\frac{60\,W}{P}$ = ml. of 0.167 $Cu(En)_2$ solution, and

$\frac{40\,W}{P}$ = ml. of 1.00 $Cu(En)_2$ solution;

where W = weight of moisture-free sample in grams,
and P = cellulose concentration in per cent.

It has been found that when the time of fall of the ball in a $Cu(En)_2$ cellulose solution is less than 10 seconds or more than 30 to 40 seconds, the resulting viscosity may be in error. When the time of fall is 10 seconds or less, an error of 0.1 second in timing the falling ball will give an error in the viscosity figure of 1% or more. If the time of fall of one ball is much greater than 30 seconds, the total time required to obtain check results on two or more balls and to determine the temperature, will be so great that temperature fluctuations may occur. Under such conditions the concentration of cellulose should be changed to more or less than 1% to keep the time of fall in a range greater than 10 seconds or less than 30 seconds. The following relationship between viscosity and time of fall for pulps of varying viscosities gives the approximate concentration at which pulps of such viscosities should be run:

Viscosity *centipoises*	Cellulose concentration, *per cent*	Moisture-free sample, *gram*	Cupriethylenediamine 0.167 *M*, *ml.*	Cupriethylenediamine 1.00 *M*, *ml.*
18 to 25	2.50	0.6250	15.00	10.00
25 to 45	2.00	0.5000	15.00	10.00
45 to 90	1.50	0.3750	15.00	10.00
70 to 150	1.25	0.3125	15.00	10.00
120 to 400	1.00	0.2500	15.00	10.00
350 to 1600	0.75	0.1875	15.00	10.00
1000 or more	0.60	0.1500	15.00	10.00

Make a preliminary determination on a 1% dispersion of the pulp sample in the $Cu(En)_2$ as described below under Procedure. Then from the above table select and weigh out the amount of sample necessary to give the proper cellulose concentration for the final determination.

Procedure

Connect the bottles containing the two $Cu(En)_2$ solutions to 25-ml. side-arm Mohr burets. Fill the burets by maintaining a 2-pound nitrogen pressure on the bottles. Add the calculated amount of 0.167 M solution to the dissolving bottle, taking care that the pulp sample is thoroughly wetted. Then add the proper amount of the 1.00 M solution, sweep the bottle out with a stream of nitrogen for at least 15 seconds, and quickly screw on the cap.

Note: The nitrogen is supplied through a vertical 5-mm. glass tube, the upper end of which is connected to a nitrogen cylinder with a reducing valve set at approximately 2 pounds per square inch pressure. The dissolving bottle is swept free of air by adjusting it to the glass tube in such a way that the lower end of the tube extends just below the neck; the bottle is then tipped and slowly rotated so that the nitrogen stream sweeps over the surface of the liquid at all corners of the bottle. The bottle cap is held in such a position that the nitrogen escaping from the bottle sweeps out the interior of the cap.

Shake the solution bottle by hand or on a machine for exactly 3 minutes to disperse the cellulose completely. A convenient and satisfactory machine shaker maintains approximately 200 shaking cycles per minute with a 3- to 4-inch amplitude. At the end of this shaking time place the solution bottle on its side for 2 minutes to allow the large bubbles formed during shaking to escape. Then pour the solution carefully into the viscosity tube.

Viscosity Measurement

Place the viscosity tube in a tube holder (Fig. 3) which is so constructed that the tube is held in a vertical position. Place a shielded fluorescent light behind the tube holder so that the passage of the ball may be seen. Measure to the nearest 0.1 second the time required for a $\frac{1}{16}$ inch aluminum ball to fall between the etched rings on the tube. More than

one ball should be timed to assure an accurate test. Duplicate times should agree within 1%.

As soon as the falling-ball time has been determined, measure the temperature of the solution to the nearest 0.1°C. It is very important that the temperature of the room be relatively stable so that there will be no fluctuations in the solution temperature during the dropping of the balls and the temperature measurement.

CALCULATION

The viscosity of the solution is calculated by the following equation:

$$\text{Log } V = \log C + \log t + (T - 25.0^\circ \text{ C.})\ (0.01866),$$

where V = viscosity of $Cu(En)_2$ cellulose solution at 25.0° C. in centipoises,
t = time of fall in seconds,
T = temperature of solution in degrees centigrade,
and C = tube constant.

If the time of fall is determined at concentrations other than 1%, make the temperature correction and apply the following formula to convert the viscosity determined at concentrations other than 1% to that of 1% cellulose concentration:

$$\text{Log } V_1 = \frac{\log V_P + (P - 1)\ (K)}{P},$$

where V_1 = theoretical viscosity at 1% concentration and 25.0° C. in centipoises,
P = percentage concentration used,
V_P = measured viscosity, at concentration P and 25 ± 0.1° C.,
and K = a constant which is 0.73 for bleached pulps and 0.63 for unbleached pulp.

Note: For rag pulps the constant K is believed to be 0.73, although sufficient work has not been done as yet to establish this with certainty.

REPORT

Results shall be reported in terms of centipoises as the cupriethylenediamine viscosity by the falling-ball method and shall represent the average of at least two separate tests.

PRECISION

Duplicate samples should check within 2%.

Additional Information

1. Unbleached pulps can be tested directly only by the falling-ball method; in the viscosity pipet method the undissolved lignin may plug the capillary. For testing unbleached pulps by the viscosity pipet method and, optionally, by the falling-ball method, the following procedure may be used.

To 20 grams of airdry pulp in a 500-ml. Erlenmeyer flask add 250 ml. of a solution containing 2 ml. of glacial acetic acid and 10 grams of sodium chlorite, $NaClO_2$. Heat the pulp suspension to 80°C. and hold at this temperature for approximately 30 minutes with occasional agitation. Wash the pulp and make into several thin sheets. Dry the sheets in an oven at 100 to 105° C. for about 3 minutes, and shred them. Determine viscosity as specified under Procedure.

2. When the viscosity pipet method is applied to pulps of very high viscosity, it may be desirable to apply the solvent in two stages, at two strengths, to hasten solution of the samples.

Weigh the equivalent of 0.125 gram of moisture-free pulp and introduce into the dissolving tube; add 15 ml. of a $Cu(En)_2$ solution adjusted to 0.167 copper molarity, and thoroughly wet the pulp sample with this solution. Then add 10 ml. of the cupriethylenediamine solution of 1.0 copper molarity. Dissolve the sample in the usual manner. This procedure gives 0.5% solution of cellulose in $Cu(En)_2$ (0.500 M in copper) and is equivalent to the standard procedure.

3. Table I gives tentative correlation between various viscosity methods in use at the present time. The 1% $Cu(En)_2$ viscosities at 25°C. were determined according to the method given above. The Picatinny seconds viscosities were determined according to the U. S. Army Specification No. 50-11-100B (27 May, 1944). The 2.5% A.C.S. viscosities were determined according to the method described by the American Chemical Society *(5)*. The viscosities determined by the TAPPI method were taken from a paper by Corey *(6)*. The 1% cuprammonium viscosities were determined by the method given by Hatch, Hammond and McNair *(7)*. The 0.5% $Cu(En)_2$ capillary viscosities were obtained by preparing solutions of 0.5% concentration according to the method given above for the falling-ball measurement but determining the actual viscosities with Cannon and Fenske capillary pipets.

4. The procedures described above have been modified in some respects for application as routine mill control methods. The necessary modifications are chiefly those involved in quick preparation of the test specimen. Reference should be made to the original literature for details *(1, 2, 3, 4)*.

TABLE I.—VISCOSITY CONVERSIONS

(Determined by Research Laboratory of the Weyerhaeuser Timber Co.)

1% $Cu(En)_2$ Viscosity at 25° C. in cp.	Picatinny Seconds	2.5% A.C.S. Viscosity at 25° C. in cp.	Cuprammonium: 1% Falling Ball Visc. at 20° C. in cp.	Cuprammonium: TAPPI 1% Viscosity at 20° C. in cp.	0.5% $Cu(En)_2$ Capillary Viscosities at 25° C. in cp.
10	....	....	6	7.5	...
20	6.0	134	11	12	5.0
40	14.5	322	20	18.5	8.4
60	24.5	546	27.5	25	10.9
80	35	780	33	30	13.0
100	48	1070	39	36	14.8
120	61	1360	43	42	16.6
140	74	1650	48	46	18.1
160	88	1962	52	50	19.4
180	102	2275	56	54	20.6
200	117	2609	61	57	21.6
220	133	2966	65	61	22.6
240	150	3345	69	64	23.6
260	167	3724	72	67	24.5
280	184	4103	76	70	25.4
300	202	4505	80	73	26.3
320	220	4906	84	75	27.2
340	239	5330	87	78	28.0
360	258	5753	91	80	28.9
380	277	6177	95	83	29.7
400	297	6623	98	85	30.6

(Determined by Ecusta Paper Corp.)

0.5% $Cu(En)_2$ Capillary Viscosities at 25° C. in cp.	TAPPI 1% Cuprammonium Viscosity at 20° C. in cp.
2	4
3	6
4	9
5	12
10	25
15	38
20	52
25	70
30	94
35	124
40	170
45	224
50	282
55	340

5. The falling-ball method is to be applied to pulps at such concentration that the time of fall is more than 10 seconds and less than 40 seconds. The viscosity pipet method can be applied to bleached pulps in any viscosity range provided the efflux time is within the limits specified in the table given above.

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Improvements in Evaporator Engineering*

By R. E. Bergstrom[1] and J. R. Lientz[2]

Abstract

With the introduction of the long tube vertical, natural circulation evaporator for concentration of black liquor, it has been possible to make radical improvements in steam and water economy. Seven effect evaporators have operated with steam economies as high as 5.5.

The application of a multipass heating element has resulted in more effective use of tubular heating surface with consequent reductions in space requirements and first cost.

Stainless steel alloys have been effectively applied where conditions of corrosion justified their use. Chromium plated tubes have been developed and used in surface condensers as well as evaporator bodies.

Evaporator room operation has been improved through effective instrumentation and technical service studies. In many cases, evaporator capacities have been greatly increased merely by improvements in techniques of operation and control.

As the postwar era of pulp mill operations is entered, it is apparent that basic objectives of mill management and the efforts of operating men are directed toward improvements to plant equipment and methods of operation which will result in lower costs per ton of pulp manufactured.

The time is approaching when the demand for pulp and paper will be balanced by the available supply. Competition will then again be a fundamental incentive for improvement. Today, the industry is already faced with increasing labor and material prices which reflect heavily in both operating and maintenance costs of the mills.

At the moment, money is relatively "cheap" and thus, by reducing production costs, greater capital outlays for equipment can be justified than in prewar times.

In brief, it might be said that the theme of the times is "to install today the most efficient equipment possible in order to produce the lowest future overall production cost."

With this problem in mind, the machinery equipment manufacturer is faced with a greater obligation than ever before to apply up-to-date improvements when engineering new equipment or modernizing existing installations. This must be done in the face of present day conditions when business is good, shops are filled with work and sufficient experienced manpower is not available. These are circumstances which are not conducive to the aggressive adaptation of changes designed to improve apparatus and operation.

Throughout the last decade there have been constant improvements in black liquor evaporator engineering. The greatest forward step came with the introduction of the natural circulation, long tube vertical film type evaporators to the American pulp mills. With this design it is possible to obtain the highest evaporative capacity per dollar of investment with an absolute minimum of chemical loss resulting from entrainment. In working out this development, established practice used on forced circulation evaporators was followed in baffling the vapor side of the tubes to produce positive directional flow of steam, condensate, and noncondensable gases through the heating element. The result was a high vapor film coefficient. At the same time, other design principles were applied to reduce the hydrostatic head of liquor on the heating surface with a resulting increase in working temperature drop and a greater heat transfer rate per square foot of heating surface than is obtained in submerged tube type evaporators. Use of longer tubes increased surface velocities so that higher liquor film coefficients were then obtained.

After the LTV, film type, natural circulation evaporators came into common use, it was possible, as a result of knowledge gained from earlier installations, to reduce the sizes of vapor heads and heating elements, simplify liquor piping, apply efficient methods for separating liquid and vapor, and improve efficiencies by perfecting liquor and condensate flash systems.

Economical use of steam and condensing water of course, has been a primary consideration. In 1932, the first modern long tube evaporator was installed as a double effect unit in a Wisconsin mill. Following this, the trend was rapidly toward triple effect, quadruple effect, quintuple effect and sextuple effect designs. Today, sextuple effect (i.e. seven stage) designs are already in operation.

As effects were added, the systems using backward liquor feed divided between the last two stages and the method of using compounded first effects were developed to increase operating economy and equipment flexibility.

The conception of equipment size changed as time passed. It used to be that high capacities were in terms of hourly evaporation rates of 25,000 to 50,000 pounds. Today a single black liquor evaporator can remove more than 500,000 pounds of water hourly.

With these developments, overall steam economies have been increased from 1.4 pounds of water evaporated per pound of steam to 5.5 pounds of water evaporated per pound of steam. Water requirements have been correspondingly reduced. Evaporator room chemical losses have been effectively eliminated. Outage of equipment has been minimized. Installation cost per unit of evaporation has been materially reduced.

These recent developments and improvements in design and operation of modern black liquor evaporators may be classified under several general headings: 1. improvements in design resulting in greater economies with minimum capital expenditures; 2. improvements in materials of construction, i.e., better application of proper materials; 3. improvements in layout; and 4. improvements in operating technique.

Improvements in Design

The application of long tube vertical evaporators in the field of black liquor evaporation was paralleled from the beginning with extensive experimental work in our development laboratories. In this application, as

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in many, it has been very difficult to translate theoretical formulae into actual design figures without applying liberal "experience factors."

However, trends of thinking have been developed in experimental work which have made is possible to interpret experience in actual operation. This has made it possible to proportion tubes so that the proper tube length, diameter, and liquor flow will be maintained to give maximum heat transfer rates across the heating surfaces and maximum utilization of the total available temperature drop in any evaporator system.

It is best to use much longer tubes than those installed in earlier evaporators. Although 14 and 16 foot tubes were used in 1934, 20 to 22 foot tubes in 1940 and 22 to 24 foot tubes in 1944, 26 and 28 foot tubes and even considerably longer ones are now designed.

A rather recent, novel change in design has been the use of a multiple pass heating element in a single body. Some of these units are now in operation. In general, this improvement has been applied to the first effect (high density effect) where the heat transfer rates are lower because of increased liquor viscosities, and the quantities of liquor flowing through the tubes are small. Typical practice with LTV installations has been to use two separate bodies in the first effect if the required liquor density is greater than 50% total solids. Use of the multipass design permits more effective proportioning of tubes and at the same time reduces the space requirement and capital cost of the equipment. Stainless steel protection is used and the result is an evaporator having a long life at a lower initial investment than previous designs employing two bodies in the first effect.

In conjunction with this multipass development and increased knowledge of the benefits of proper tube proportioning, controlled recirculation in various bodies is being studied in a continued effort to develop optimum heat transfer rates in each effect.

The problems of foam handling, entrainment separation and pressure loss are continually being investigated. Losses resulting from entrainment in a modern black liquor evaporator, properly designed, are negligible. An evaporator room loss of 1 pound of saltcake per ton of pulp is now considered an average figure. Even in starting up an evaporator, it is now possible to place the unit "on the line" with practically no carry-over into the so-called "contaminated" condensate or the condenser water. The ever increasing problem with stream contamination makes this an important issue. At the moment there is an extensive research program covering the problem of entrainment separator design under way at the University of Michigan.

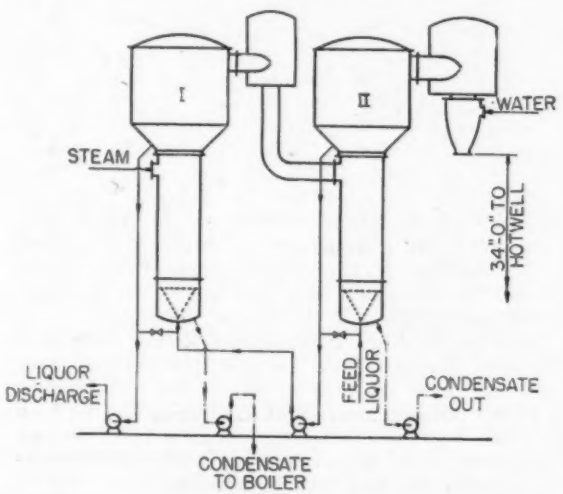

FIG. 1
Double Effect L.T.V. Evaporator. Economy 1.4 Pound Evaporation per Pound of Steam (Approx.)

Improvements in this field have been directed toward the elimination of pressure losses through the separators to increase capacity without sacrificing catchall efficiency. This is a particularly important problem when the number of effects in a multiple effect installation is increased, because losses in the working temperature drop are magnified as the extra stages multiply the losses resulting from additional pressure drops and boiling point elevations. Space considerations are often important. Several recent installations have been made with very effective internal separators in the vapor heads to reduce required floor area and to simplify the supporting steelwork.

Improvements in Materials and Methods of Construction

It is usually said that the most common types of 18-8 stainless steel, such as types 302 and 304, are perfectly resistant to the corrosive effects of sulphate and soda black liquor. There have been isolated cases of failure of this metal in severe service, but the usual experience has been exceptionally good.

Some years ago, the use of stainless steel clad tube sheets became common in black liquor evaporators. The first designs utilized a heavy steel plate to which was plug welded a $\frac{3}{16}$ inch thick 20% stainless steel clad plate. The corrosion resistant qualities of this design were acceptable, but the light-clad plate in a few instances became loosened from the steel backing plate during retubing operations. With the introduction of heavier homogeneously-boned clad plates, it has been possible to eliminate this fabrication problem. At present 1¼ inch thick, 20% 18-8 clad plates are almost universally used in the first effects where tube sheet corrosion is severe.

The forced-circulation evaporator practice of stainless steel armoring sections of the first effect heating element extending into the vapor head was also adopted. Such construction permits use of stainless steel tubes in these heating elements without fear of failure at some point other than the tubes. It is, of course, absolutely desirable to use stainless steel clad tube sheets when stainless steel tubes are installed.

It should be mentioned that some early installations were made using stainless steel tubes with steel tube sheets and steel heating element shells. In the course of time, the elements failed because of chemical corrosion, but the same tubes were used in replacement elements. The tubes are usually shortened about 6 inches. It is nearly always possible to add sufficient tubes to replace the surface lost in the operation.

Concurrent with the armoring of the heating elements came the requirement for protecting the first effect vapor heads. Again stainless steel has been effectively used. Experience has indicated that all vapor head corrosion occurs at a level below the rim of the liquor deflector, so that only the lower vapor head section needs to be protected.

The tube life problem is continually attracting attention. Improvements of process and operating techniques leading to higher capacity evaporator opera-

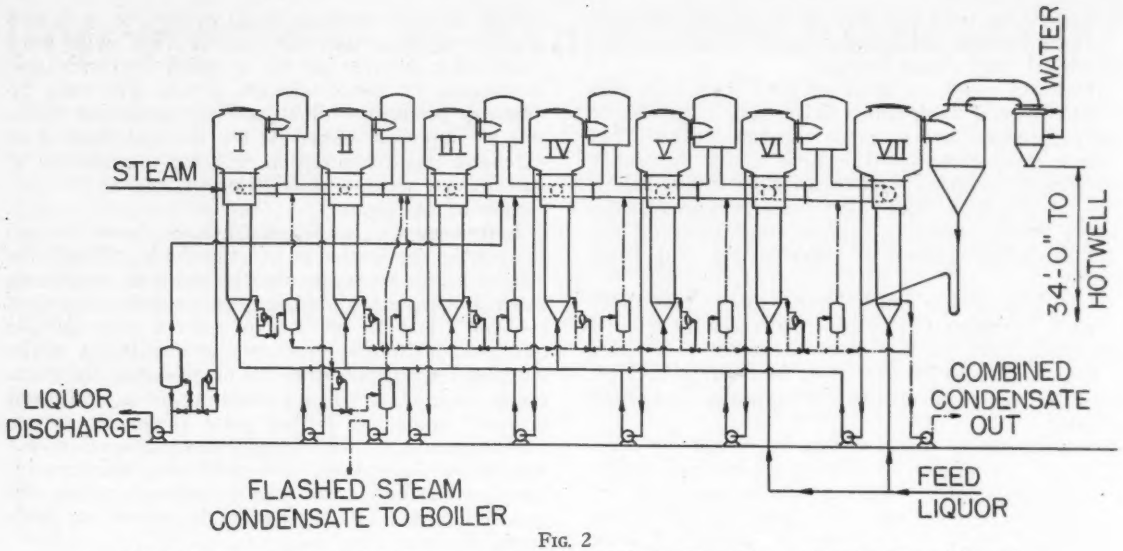

FIG. 2

Seven Body Septuple Effect L.T.V. Evaporator. Economy—5.5 Pounds Evaporation per Pound of Steam (Approx.)

tion and reducing scaling tendencies, have resulted in reduced evaporator tube life when steel tubes are used. The increasing use of higher steam pressures and unusual types of chemical makeup have been other contributing factors. During the war period it appeared at times that the tubes themselves were below previous standards for surface conditions and general corrosion resistance.

It is well established, of course, that type 304 stainless steel tubes are entirely successful. Tubes in continuous operation under forced circulation conditions since 1929 still are showing no wear on either liquor or vapor side. The cost consideration is important, however, and to date it has been difficult to justify the use of stainless steel under any but first and second effect conditions in LTV machines. At present over 50% of the mills in the South have stainless steel tubes in their first effects.

Extensive experimentation has been carried on with various types of alloy tubes in an effort to develop tubing less expensive than stainless steel with corrosion resistant qualities justifying its use. Five per cent nickel tubing appears to have some possibilities, but the experience with this material has been influenced by the local mill conditions and the results obtained cannot be correlated. At the moment 9% nickel tubes (a war development) are being tried—possibly these will do a good job.

Tube life, in general, has been much shorter under conditions of higher temperature and concentrations. Under such conditions failures have nearly always occurred from the liquor side, that is, the inside of the tube in an LTV evaporator. Much of the experimental work has been directed at this part of the problem. At the same time, however, there is a tube life consideration in the latter effects of a black liquor evaporator. In these bodies, failure universally occurs from the outside or the vapor side, and the inside surface remains in perfect condition throughout the life of the tube. Tube wear in these bodies is accelerated by the presence of a scale which forms on the vapor side of the tubes. If the scale becomes heavy, pitting occurs rapidly under the scale particles and small pinhole leaks develop which are difficult to detect and, of course, are detrimental to the evaporator operation. The scale itself reduces the heat transfer rates considerably.

An apparent solution to this problem has been found in the use of bimetallic (chromium plated) tubes. Chromium plated tubes were first installed on an experimental basis in 1935. At that time it was necessary to develop the entire technique of pickling, polishing, and plating the tubes. After this was done it was necessary to experiment with various thicknesses of plate to determine the optimum weight for perfect corrosion resistance. There was a problem of developing tube rolling procedures so that the plated surface would not be cracked or etched in such a manner that a pinhole failure would occur. All of the experimental installations have indicated that these tubes, properly chromium plated, are absolutely resistant to the corrosive effects of the vapors in the latter effects of a black liquor evaporator and in surface condensers. In addition, this type of surface develops a high rate of heat transfer apparently because dropwise condensation is attained in part on the vapor side of the tube. Most important is the fact that the initial rate of heat transfer of plated tubes can be maintained over long periods of time.

The initial success of chromium plating led to consideration of the desirability of plating on both the inner and outer tube surfaces. Present plating techniques and obvious inspection difficulties so far have prevented this, but it has been possible to plate tubes on the inside 2 to 3 feet from the ends. Results which indicated perfect corrosion resistant qualities of the plated surface on the liquor side, have led to the consideration of such tubes for 2nd effect conditions of operation where wear usually occurs in the upper 12 to 30 inches of the tube. Work is continuing in this line of application.

The applications of chromium plating have been hindered during the war because tube surfaces have generally been of such a nature that polishing to a proper finish to insure uniform plating has not been possible. There are, however, several complete sets of chromium plated tubes operating in surface condensers along with other trial installations.

Pump applications have also been influenced by the increased use of alloys. Early practice was to

use cast iron pump casings with stainless steel impellers, shafts, and trim. Wear of the cast iron pump casings was relatively rapid with a resulting loss of time and extra maintenance expense to change pumps. Losses of capacity often resulted when the pumps became worn to a point where they couldn't handle the required amount of liquor.

It is now common practice to use solid alloy pumps. It is possible to install these for less cost than the cast iron type design previously used. At the same time improvements in pump design have increased operating efficiencies resulting in lower power requirements.

Improvement in Layout

The physical design and layout of an evaporator have a great influence on the operating and maintenance costs of the unit.

It has been desirable to make all piping and valving as simple and accessible as possible. Nearly all multiple effect units now are built with complete header systems for vapor, liquor, and condensate piping, allowing any body to be bypassed without difficulty. Such arrangements minimize time lost from operation when a body is cut out for retubing, inspection, or repair. Maintenance labor requirements are also reduced with header piping systems.

Some recent installations have been made out-of-doors using structural steelwork and outdoor insulation rather than a complete building.

In such cases, a central operating station has been built containing all the instruments, motor starting switches, and liquor test connections necessary for easy operation of the unit. The primary advantage has been a saving of first cost of installation. At the same time, very attractive installations have resulted.

Improvements in Operating Techniques

As the design has been improved and the efficiency of operation of modern evaporators increased, it has become necessary to develop operating techniques in a similar manner. It is no longer desirable to shut down a machine, determine through inspection what has to be done and then make arrangements to do the work. It is unnecessary to shut down every weekend to clean plugged tubes and make routine repairs. Today, through the use of complete instrumentation, data from the technical service department and normal operating records, it is possible to predict tube life and arrange for boil-outs, etc., with a complete knowlege of the point next needing attention. The use of such information has made possible "preventative maintenance programs" which have reduced maintenance costs and production losses resulting from unexpected shutdowns.

Complete instrumentation has simplified this problem from the standpoint of eliminating much of the operator's work and presenting operating records easily filed for future reference. The average evaporator today will have steam and liquor flow controllers operated from a central control point. All motors will have warning lights and alarms to call immediate attention to pumping difficulties. Gravity recorders have been developed which continuously measure liquor concentrations. Level alarms are used on weak and heavy liquor tanks. Conductivity alarms indicate entrainment which may result from unusual conditions of operation. Multipoint temperature instruments are being used to record temperatures of vapor and liquor in individual bodies. In general, all these instruments are located on a panel at a central point in the evaporator room so the operator can always have a complete picture of operation directly in front of him.

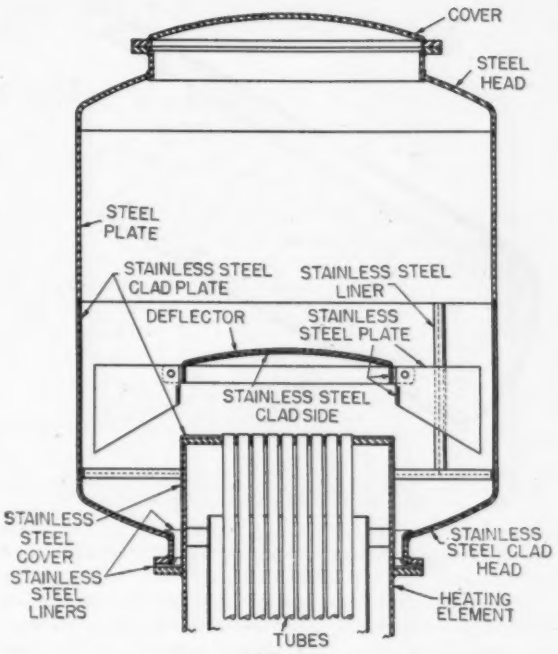

FIG. 3
Sectional View of I Effect Vapor Head Illustrating Stainless Steel Protection

Such arrangements have made it possible for one operator to run two, three and even more sets of evaporators without difficulty.

The growing technical service departments of progressive mills have contributed materially to the improvements in evaporator operation. Technically trained men with a knowlege of the evaporator heat balance can make comprehensive tests on short notice, when unusual operating conditions occur, to determine proper remedies for trouble. Several mills have set up routine procedures for testing and reporting evaporator operating conditions at regular intervals. These tests, along with the recorded data from the instruments, form a sound basis for the preventative maintenance planning already mentioned.

As a result of technical service studies many mills have greatly increased the production capacity of the evaporator by removing obvious bottlenecks and simple operating difficulties as they appeared.

In many cases, manufacturers have worked closely with the mills to assist in the development of testing procedures, to recommend proper instrumentation, and to help analyze operating data as they were made available.

In reviewing the improvements of black liquor evaporator engineering during the past years, it may be said that technical developments have been carried on continuously. Increased knowledge of multiple effect design has permitted the use of more stages with constant improvement of steam and water efficiencies and corresponding reductions in operating costs. Studies of factors affecting basic heat

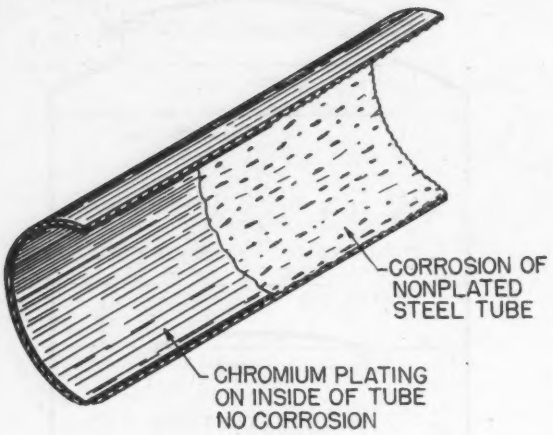

FIG. 4

Sectional View Through Partially Chromium Plated Steel Tube After Approximately One Year of Operation

transfer rates have made it possible to improve capacities of existing machines and to design new equipment for lowered costs per unit of evaporation. The multipass heating element has been successfully adapted to black liquor. Studies of alloys for tubes and other applications have led to the general conclusion that the 18-8 stainless steels are most acceptable. No less expensive alloy has yet proved entirely practical. Chromium plated tubes have been developed and successfully used to increase tube life and reduce scaling problems.

Application of modern instrumentation and use of technical service on a practical basis have helped improve overall operating conditions of many existing black liquor evaporators.

New TAPPI Members

The Executive Committee of the Technical Association of the Pulp and Paper Industry has elected the following to membership:

Jagdish C. Aggarwala is traveling in this country under the auspices of the Government of India, Department of Education, studying pulp and paper technology. He is a 1941 graduate of Punjab University, and was formerly employed by the Shree Gopal Paper Mills Ltd., Abdullapur, India, and the Forest Research Institute, Dehra Dun, India.

Edward R. Avrutik, Assistant Chemist, Oxford-Miami Paper Company, West Carrollton, Ohio, a 1943 graduate of the New York State College of Forestry. He was formerly employed by the Chesapeake Corporation, West Point, Virginia, and spent two years in the United States Army.

Henry G. Booth, Chemical Engineer, Gair Bogota Corrugated & Fibre Box Corporation, Bogota, New Jersey. He has been with the Robert Gair Company in New York City and Piermont, New York, since 1933, and is a 1932 graduate of the University of Maine.

John J. Carroll, Jr., Assistant Chief Engineer, Chemipulp Process, Watertown, New York, a 1940 graduate of Clarkson College. He has been with the Chemipulp Process since graduation with the exception of three years' service in the United States Army.

Oscar K. Chapman, Technical Director, Pulp Division Weyerhaeuser Timber Company, Everett, Washington, a 1931 graduate of the University of Washington. He was formerly employed by the Puget Sound Pulp and Paper Co., and spent four years in the United States Navy.

Elroy E. Clark, Plant Engineer, Blandin Paper Company, Grand Rapids, Minnesota. He has been with this company since 1931 with the exception of three years in the United States Army. He attended the University of Minnesota.

Harry K. Collings, Executive Assistant, Canada Paper Company, Montreal, P. Q., Canada, a 1928 graduate of the Royal College of Science. He was formerly employed by the National Building Materials Ltd., Wiltshire, England, and by the Howard Smith Paper Mills Ltd., and the Allied War Supplies Corporation, both of Montreal, P. Q.

John H. Doherty, Chemical Engineer, Union Bag & Paper Corporation, Savannah, Georgia, a 1940 graduate of the Carnegie Institute of Technology. He has been with his present company since graduation with the exception of four years in the United States Navy.

Robert J. Gilmer, Chemical Engineer, Ontonagon Fiber Corporation, Ontonagon, Michigan, a 1944 graduate of the Michigan College of Mining and Technology.

Carl G. Krancher, Plant Engineer, Ohio Boxboard Company, Rittman, Ohio, a 1927 graduate of Cornell University. He was formerly employed by the International Paper Company, Ticonderoga, New York.

Robert A. Larson, Technical Assistant, Maine Seaboard Paper Co., Bucksport, Maine. He attended the University of Maine, and was formerly employed by the National Building Box Co., New Haven, Connecticut.

John A. McPherson, Assistant Operation Manager, Mosinee Paper Mills Company, Mosinee, Wisconsin, a 1935 graduate of Dartmouth College. He was formerly employed by the U. S. Forest Products Laboratory, Madison, Wisconsin; The Wausau Paper Mills Company, Brokaw, Wisconsin; and Oliver United Filters, Inc., New York City. He has just completed four years in the United States Marine Corps.

TAPPI Notes

Neil F. Robertson, formerly of the Crossett Lumber Company, is now chemical engineer for the Cellulose Engineers, 71 Columbia Street, Seattle 4, Wash.

Harold R. Alley, formerly of the Arvey Corporation, is now chief chemist in the Research Department of Mystic Adhesive Products Division, Chicago Show Printing Company, Chicago, Illinois.

Robert K. Stamen, formerly of the West Virginia Pulp & Paper Company, is now with the Curtis Publishing Company, Philadelphia, Pa.

George T. Howe, formerly of the Plastic Film Corporation, is now plant manager of Susquehanna Plastics, Inc., 498 Seventh Ave., New York 18, N. Y.

Surrey W. Slater, formerly of the Mead Corporation, is now with Hearst Enterprises, Inc., 959 8th Ave., New York 19, N. Y.

K. C. Ying, formerly of the Nekoosa Edwards Paper Company, is now with the Nation Resources Commission of China, 111 Broadway, New York, N. Y.

D. D. Cameron, of the Hercules Powder Company, has been transferred from Kalamazoo, Mich., to Marrero, La.

Greville Sandstrom, research director of Sandarne Sulphate Pulp Company, Sandarne, Sweden, is visiting in the United States.

Grinding the Beating Surfaces of the Standard Laboratory Beater*

By Loren V. Forman[1] and Donald D. Niemeyer[2]

Abstract

A grinding procedure for the TAPPI standard beater is described. The standard grinding with emery dust is used to produce a fit between the roll and bedplate. Then the final conditioning of the tackle is obtained by grinding with a suspension of sawdust in water. Although the latter operation is relatively slow, the method is more reproducible in its effect and the bedplate bars do not require replacement as frequently because grinding is less severe.

The procedure commonly used for grinding the tackle of the standard beater is described in TAPPI Standard T 200. The method specifies that the beater shall be charged with a pulp suspension containing 120-mesh emery dust, and that the bedplate shall be held against the roll until a good fit is obtained; the tackle is then considered adequately sharpened. It was observed that the method did not always reproduce the normal beating action and occasionally the tackle seemed to become dull. In 1940, The Institute of Paper Chemistry developed a technique which has given more dependable results. Instead of powdered emery, the principle sharpening effect is produced by grinding the tackle with a water suspension of sawdust. The details of the method and its advantages and limitations are discussed below.

Calibration of Beater

The condition of the beating tackle is determined in the following manner. A portion of a bale of unbleached sulphite pulp is reserved as a reference standard. A representative sample of the standard pulp, obtained by boring, is evaluated by the beater method. At each interval of beating, Schopper freeness is determined and handsheets are made in accordance with TAPPI Standard T 205. After the beater has been used for a number of tests, the process is repeated. If a comparison of the data with the previous results shows a significant divergence, the beating tackle is reground. Whenever this divergence occurs, it implies that the beater evaluations preceding the calibration test are invalid.

The bedplate and roll knives of a beater that has been in use for some time will have a smooth, polished surface. In order to have a uniform beating action, the grinding procedure should also produce a polished surface on the knives. This condition is not obtained by grinding with 120-mesh emery.

The bars in the roll develop a burr on the trailing edge and, at times, on the leading edge. If a burr is formed on the leading edge of the roll knives, the calibration data will usually indicate that the beating action has changed.

The wood fillers in a new bedplate and the lead with which the bed knives are placed in the bedplate holder are flush with the curved surface formed by the bars. After normal use of the beater, the wood and lead tend to wear down slightly below the level of the bedplate bars. However, this condition does not change the beating action appreciably.

Grinding

The tackle of a beater is ground whenever:

1. A new bedplate is installed.
2. A new rubber diaphragm is required. (This applies primarily to the older models of the beater.)
3. The bedplate chatters excessively during the last portion of a regular beater test, indicating an improper fit of the roll on the bedplate or an unsymmetrical roll.
4. The beater does not give reasonable check results in the calibration tests.

Grinding with emery, according to the TAPPI Standard, precedes the sawdust treatment in each case except the fourth condition, in which the proper beating action is restored by grinding with sawdust only.

The bedplate is held in a fixed position relative to the roll while the tackle is ground with emery dust in order to obtain a truly cylindrical roll. The clamp for this purpose, which may be obtained from the manufacturer of the beater, is fastened to the beater tub. The bedplate lever arm can be adjusted to any fixed position by means of two machine screws bearing on the upper and lower surfaces of the arm.

If the bedplate has been removed, its alignment with respect to the roll is completed by placing two strips of paper across either end of the bedplate and adjusting its level so that the strips are held with equal pressure when the bedplate is forced against the roll.

The beater is then charged with the normal amount of pulp and water, and 250 grams of 120-mesh emery are added to the stock circulating in the beater. The lever arm is lowered slowly until the high points of the roll and bedplate are touching. By pressing the ear against the lever arm, the operator can select the proper initial position and the succeeding adjustments up to the point where further decrease in the clearance between the bedplate and roll results in a smooth fit as indicated by the sound. Excessive pressure of the bedplate on the roll is avoided and only a minimum amount of grinding is done with emery dust. The mixture of stock and abrasive is transferred to a container, and the beater and bedplate well are flushed thoroughly with water. With water in the beater, the roll will run smoothly on the bedplate if sufficient grinding was applied. If the bedplate vibrates with a noticeable amplitude, the stock containing the emery is returned to the beater and the grinding is continued. Stepwise grinding and checking for smoothness of operation minimizes the tendency to over grind.

After a satisfactory fit is obtained, the burr or feather edge of the bars is removed by rubbing the side surface of each bar with a file or with emery cloth held on a flat surface. If grinding with emery

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[2] Research Assistant, The Institute of Paper Chemistry, Appleton, Wis.

dust is not required, the burr is nevertheless removed before grinding with sawdust and water.

To obtain a high polish and, hence, a more stable condition on the surface of the bars, or to sharpen tackle that fits perfectly, the beater is ground with a suspension of sawdust in water. Before this is done, the standard pulp or lap pulp taken from the same bale is evaluated in the beater but only the freeness is determined. The beating time-freeness relationship is compared with that normally obtained on the standard pulp. The difference in the rate of beating, indicated by the rate of decrease in the freeness, serves as a guide in determining how much grinding with sawdust is required.

Twelve liters of water are placed in the beater, together with 500 grams of spruce sawdust which has been screened through an 8-mesh sieve. The suspension is circulated in the beater and the lever arm of the bedplate is loaded with a 6500-gram weight. A minimum amount of beating with a given charge of sawdust is 6 hours, whereas 10 to 12 hours are usually required. After the completion of the treatment that was selected, the sawdust, which is reduced to wood flour, is transferred to a container and the beating time-freeness relationship is again determined. If this test or a subsequent calibration test indicates that the beater requires additional grinding, the same charge of sawdust is returned to the beater and beating is continued up to about 18 hours, after which a fresh charge of sawdust and water is employed. This cycle may be repeated many times without materially eroding the bars except at the points which come in contact.

During the process of grinding with sawdust, the bedplate may vibrate continuously or intermittently with a very small amplitude, causing an abnormally loud grinding noise. Apparently, this behavior does not injure the beating tackle.

Calibration Data

The data of Table I represent the beating action obtained on the standard pulp over a period of about 18 months. From 30 to 50 beater evaluations were performed between successive calibrations. Data obtained with another beater for the same period are given in Table II.

After Test 11 (Table II) was performed, fifteen beater evaluations were made on vegetable fiber pulps which contained field dirt. This changed the beating action as indicated by Test 12. The beater was ground with sawdust and water. A subsequent calibration (Test 14) indicated that the original beating action had been restored.

TABLE I.—CALIBRATION DATA FOR NO. 1 BEATER

Nominal Basis Weight of Handsheets 47 lb. (25×40—500)

	Beating Time, min.	Test 26	28	29	30
Schopper freeness, ml.	5	850	830	840	830
	20	660	625	640	665
	35	380	365	370	375
	50	220	205	230	210
Apparent density	5	12.0	12.0	12.0	12.0
	20	14.0	14.0	14.0	14.0
	35	15.0	15.0	15.0	15.0
	50	15.5	16.0	16.0	16.0
Bursting strength, points/100 lb.	5	48	47	44	49
	20	91	92	92	88
	35	97	99	101	103
	50	108	111	104	107
Tear factor	5	1.90	1.70	1.97	1.81
	20	1.10	1.10	1.27	1.20
	35	0.93	0.91	1.03	0.98
	50	0.77	0.82	0.87	0.77

Value of the Method

Grinding with sawdust and water does not constitute a means of maintaining a uniform condition of the beating tackle for an indefinite period. In certain instances, as shown in Tables I and II, the agreement between successive calibrations was not as good as normally obtained in duplicate determinations on the same pulp. Yet the divergence in such cases was not great enough nor consistent enough for all the beating intervals to warrant regrinding the tackle.

Experience with emery grinding alone or with emery grinding followed by grinding with sawdust has shown that the stability of the tackle condition is about the same for the two systems. The main

TABLE II.—CALIBRATION DATA FOR NO. 2 BEATER

Nominal Basis Weight of Handsheets 47 lb. (25×40—500)

	Beating Time, min.	Test 9	10	11	12	14
Schopper freeness, ml.	5	855	835	855	835	850
	20	700	675	680	765	685
	35	480	430	445	635	440
	50	295	265	280	455	265
Apparent density	5	12.5	12.5	12.0	12.0	12.5
	20	14.5	14.0	14.0	13.5	13.5
	35	15.5	15.0	15.0	14.0	14.5
	50	16.0	15.5	15.5	15.0	15.0
Bursting strength, points/100 lb.	5	46	42	41	42	44
	20	86	89	91	80	89
	35	107	98	116	97	109
	50	114	106	115	116	109
Tear factor	5	2.14	2.11	2.02	2.10	1.94
	20	1.40	1.40	1.26	1.41	1.27
	35	1.10	1.10	0.98	1.23	0.98
	50	0.94	0.96	0.89	1.10	0.96

advantage of grinding with sawdust is that the operation can be controlled and reproduced much more effectively than by grinding with 120-mesh emery. There is much less erosion of the roll knives and bedplate if sawdust is used. As a result, the life of the bedplate knives is greatly prolonged.

Although the period of grinding with sawdust is quite long it was found that the emery treatment consumed as much or more time, particularly if the emery grit dulled the tackle. Sawdust has never dulled the tackle. Grinding with sawdust sharpens the tackle or leaves it in the same condition if a short period of grinding is applied.

The procedure for grinding with sawdust should be regarded as a suggested method until more data are accumulated. The ultimate test can only be performed on beaters that are being used almost continuously, such as for routine pulp evaluations in control laboratories. Comments on the use of the method for maintenance of the calibration of a beater, under these and other operating conditions, are requested.

TAPPI Notes

Henry P. Petzold, Plant Engineer, Oxford Miami Paper Co., West Carrollton, Ohio, a 1927 graduate of McGill University. He was formerly employed by the International Paper Company at various locations.

Claud Christiansen, formerly of the St. Regis Paper Company, is now with the St. Marys Kraft Corporation, St. Marys, Ga.

Sidney Mintzer, formerly of the U. S. Army, is now in the Laboratory of the Panama District Engineer, Ancon, Canal Zone.

John P. Roche, Vice President of Heppenstall Company, Pittsburgh, Pa., has succeeded R. H. Musser as official company representative in the Technical Association.